AMERICA'S LARGEST TEXTILE MONTHLY

COTTON

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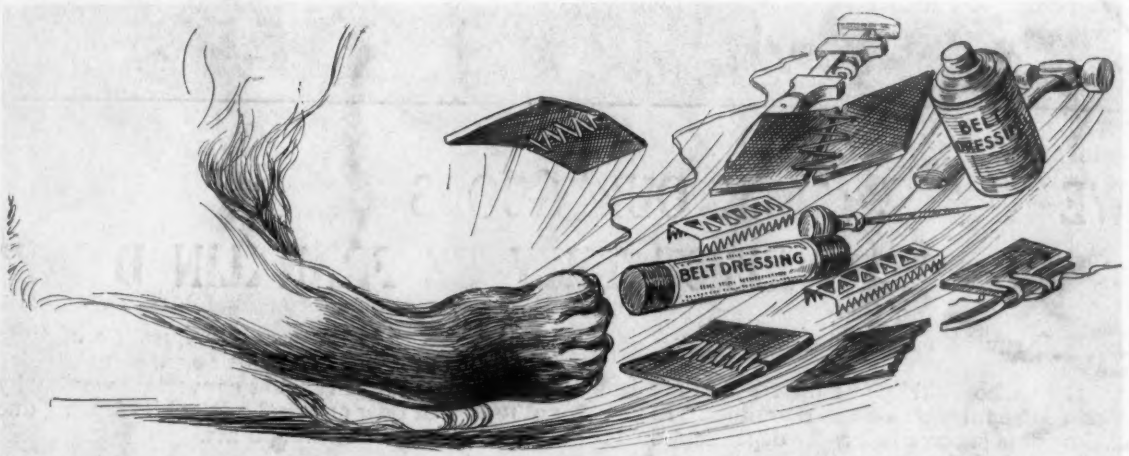

Lion Paw Belts
Maintain Themselves

LION PAW BELTING
"runs without dressing"
Manufactured by Buckner Process Co. Incorporated.

Do YOUR BELTS need constant "take up," constant "dressing," the constant and costly care of belt specialists? When your plant is idle for a few weeks, do they need special treatment to prevent deterioration?

Lion Paw Belting is self-lubricating and self-maintaining. You never have to stop your machines, once a Lion Paw Belt is tuned to service. It can never become hard or crack from disuse. The next time you order a belt, buy Lion Paw.

This booklet contains belting data—comparative tests, charts and other information interesting and valuable to the men responsible for belting economy. A copy will be sent free at your request. Write for it today.

R. D. Skinner & Co. Inc.
70 East 45th Street, New York, N.Y.
70 State Street Boston, Mass.

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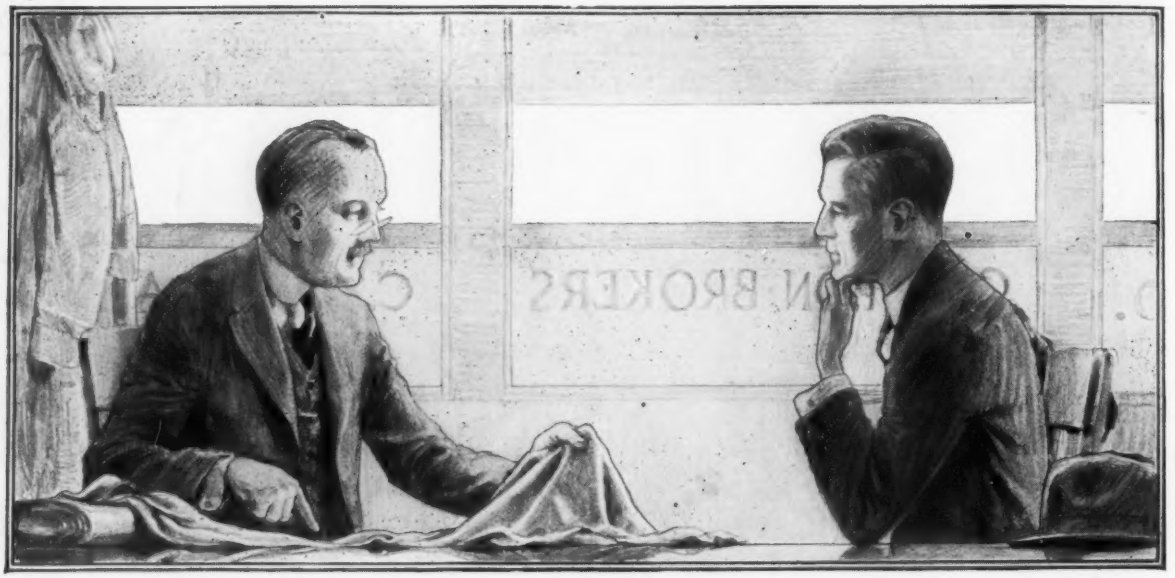


"WE TRADE MARK OUR GOODS I INSIST THEY BE FRANKLIN DYED"

Have YOU run into this situation yet?

Converters who trade-mark their goods are jealous of the reputation of their product. In fact, their business success is largely dependent on the maintenance of this reputation.

Solid, brilliant colors that are, at the same time, fast play a most important part in the good reputation of colored goods, and converters are rapidly learning that there is no more dependable way of getting such colors than by having them Franklin Dyed.

Franklin Dyeing is done in Franklin Package Dyeing Machines. That is, the yarn is dyed in packages, cones or jackspools in closed kiers under pressure. Complete penetration is obtained in this way, giving unusually brilliant and solid colors that are absolutely fast. In fact, certain very desirable colors are obtained by the Franklin Process which cannot be obtained in any other way.

Because of their strong selling qualities and their absolute dependability, converters are more and more insisting on Franklin colors in their goods. Possibly you have not run into this situation yet, but we believe it to be only a question of time before you will. Why wait for the inevitable? If Franklin colors are what converters want, why not use them **now** and make Franklin Dyeing one of your strongest selling points.

It is also to your advantage from an economical standpoint to use Franklin Dyed yarn. The method is so very direct that goods can be made both quickly and economically. You do not have to install Franklin Machines. We operate four of the most economical job dyeing houses in the world—three in this country and one in England, all of them completely equipped with Franklin Package Dyeing Machines.

Ship your yarn to us on cones, tubes or bobbins and we will dye it and return it to you on parallel tubes, cones or jackspools, as desired.

MILLS MANUFACTURING WHITE GOODS

If you use the Franklin Dyeing Process you can make colored goods without installing a dollar's worth of new equipment. Ship your yarn to us on spinning bobbins, cones or parallel tubes and we will dye it and return it to you ready for use in the V creel for warping.

FRANKLIN PROCESS CO.

Philadelphia—Greenville, S. C.—Manchester, Eng.

PROVIDENCE, R. I., U. S A.

Job Dye Houses in All Four Cities.

NORTHROP

TRADE-MARK REG U S PAT OFF

LOOMS

ON COTTON GOODS

AND MOST WORSTEDS THAT CAN BE WOVEN

WITH ONE SHUTTLE

SAVE 50 TO 75 PER CENT.

OF THE LABOR COST OF WEAVING

AND

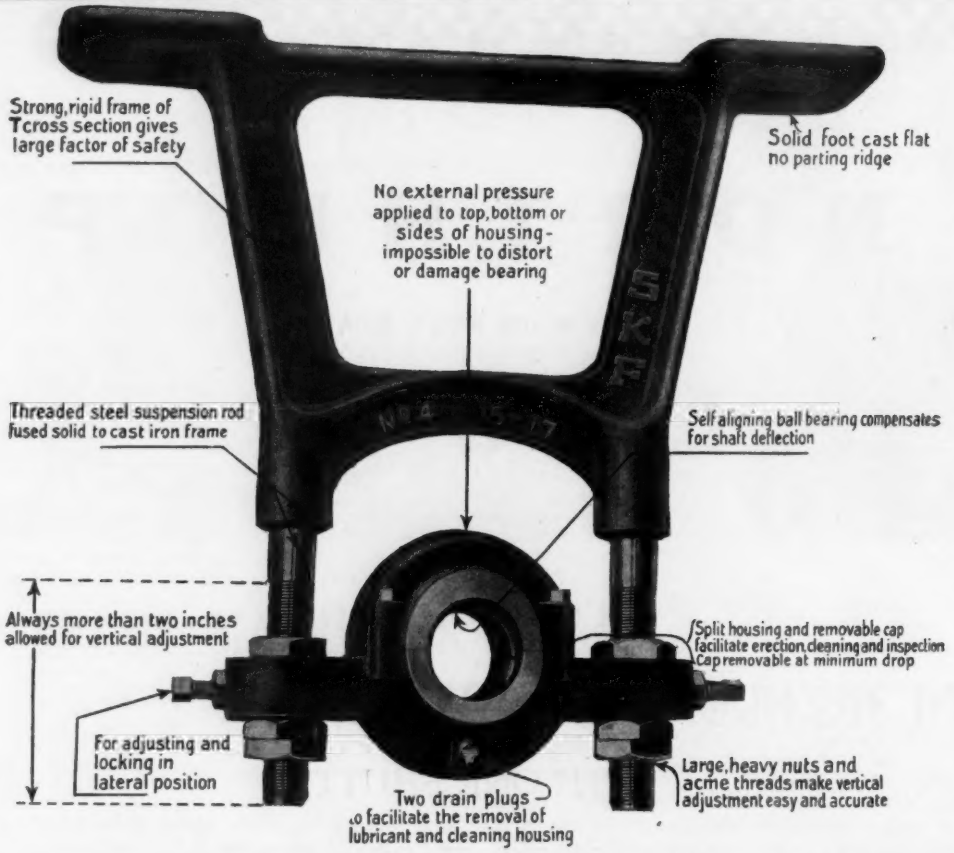
PRODUCE BETTER GOODS

DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

ATLANTA GEORGIA

Copyright 1917 by Draper Corporation


Strong, rigid frame of T cross section gives large factor of safety
No external pressure applied to top, bottom or sides of housing - impossible to distort or damage bearing
Solid foot cast flat no parting ridge
Threaded steel suspension rod fused solid to cast iron frame
Self aligning ball bearing compensates for shaft deflection
Always more than two inches allowed for vertical adjustment
Split housing and removable cap facilitate erection, cleaning and inspection Cap removable at minimum drop
For adjusting and locking in lateral position
Large, heavy nuts and acme threads make vertical adjustment easy and accurate
Two drain plugs to facilitate the removal of lubricant and cleaning housing
SKF

INTRODUCING

THE IMPROVED SKAYEF SELF-ALIGNING BALL BEARING HANGER

More than 7500 installations now in use prove the value of the old style self-aligning ball bearing hanger. All the features which made this hanger so economical and troubleproof are present in the Improved Skayef Self-Aligning Ball Bearing Hanger with additional advantages which make erection easier and service more enduring and reliable.

7500 Users Approved the Old Design — Thousands will Profit By the NEW

Let us send you full particulars regarding the many other features—or better still, ask your local transmission dealer to show you the new hanger—it speaks for itself.

THE SKAYEF BALL BEARING COMPANY - - 165 BROADWAY, NEW YORK CITY

Made Under

SKF

Supervision

723

Cold, Fresh Water for Employees—a Saving of Money for You!

Frequent drinks of clear-cold, sparkling water during the long, hot, dusty workday send your employees back to their tasks filled with renewed vigor to do better work. Cold water is the world's greatest and cheapest tonic. Give it to your workers.

Raises Workers' Efficiency

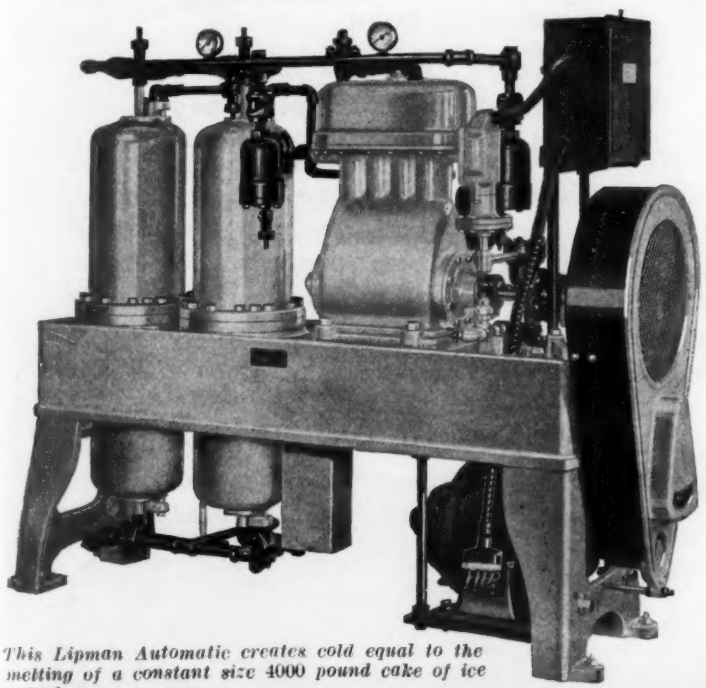
You know how frequently you use the water cooler in your office. And how refreshed you feel after each drink! How about the men and women toiling at heavy, tiring labor out in the hot workrooms? Are you supplying them, too, with frequent draughts of cooling water—giving them clearer brains, brighter eyes, new ambition and new energy?

Do away with the old system of individually iced water tanks. They take too much time and energy—water is never the right temperature—ice is too hard to handle, costs too much. There's a better way.

Absolutely Automatic

Many modern textile plants are using Lipman Automatic Refrigerating Machines to supply cold drinking water. They have proved money *savers* in cutting out ice bills and labor charges for handling ice—on these two items alone a Lipman soon more than pays for itself.

No attention, other than occasional oiling, is required to operate a Lipman. Automatically, it always keeps drinking water at exactly the temperature desired. Freezes ice, too. Many other novel uses. Your Lipman Automatic will be a money *maker*, too, in the bigger returns from contented, clear-minded, healthier employees.



This Lipman Automatic creates cold equal to the melting of a constant size 4000 pound cake of ice in 24 hours.

Permanent Satisfaction Guaranteed

Hundreds of Lipman Automatics are giving satisfaction. They're guaranteed—money back if you're not satisfied. There's probably a Lipman in a mill near you. Send for a list of prominent and satisfied users.

At your request we'll send a Refrigeration Engineer to investigate your need for cold water and ice. He can give cost figures on an installation in your plant—and you'll find them surprisingly low. It costs you nothing to get our advice—if we can't save you money we won't sell you a Lipman.

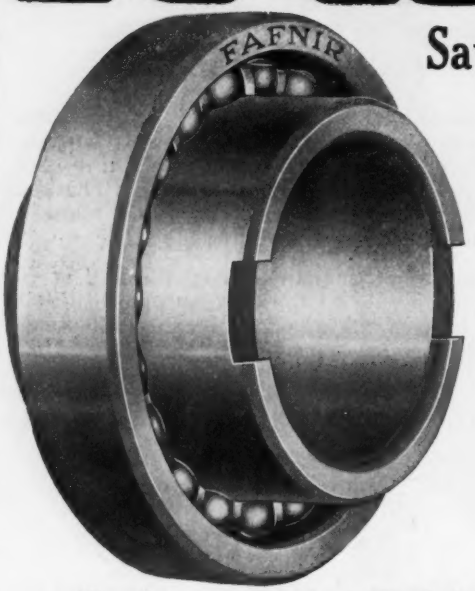
MILES REFRIGERATING COMPANY

292 Peachtree St., ATLANTA, GEORGIA

Lipman

FULL-AUTOMATIC REFRIGERATING MACHINES

FAFNIR



Save Your Power and Your Money

Nothing eats up power faster than poor line shaft bearings —and power costs real money in these days.

In the case of ***Fafnir Double Ball Bearing Hanger Boxes,*** the shafting runs on chrome alloy steel ball bearings and friction is reduced almost to the vanishing point.

The Fafnir Bearings save the power, and you save the money.

Furthermore, the ***Fafnir Box*** is a model of simplicity. The ball bearing wide inner ring does away with flimsy adjustable features, and it cannot slip on the shaft because of the driving collar which also transmits all thrust loads to the balls. The ***Fafnir Boxes*** are completely assembled (with 2 ***Fafnir Ball Bearings*** in each box) at the factory, and you receive them all ready to slip into your present hanger frames.

THE FAFNIR BEARING COMPANY

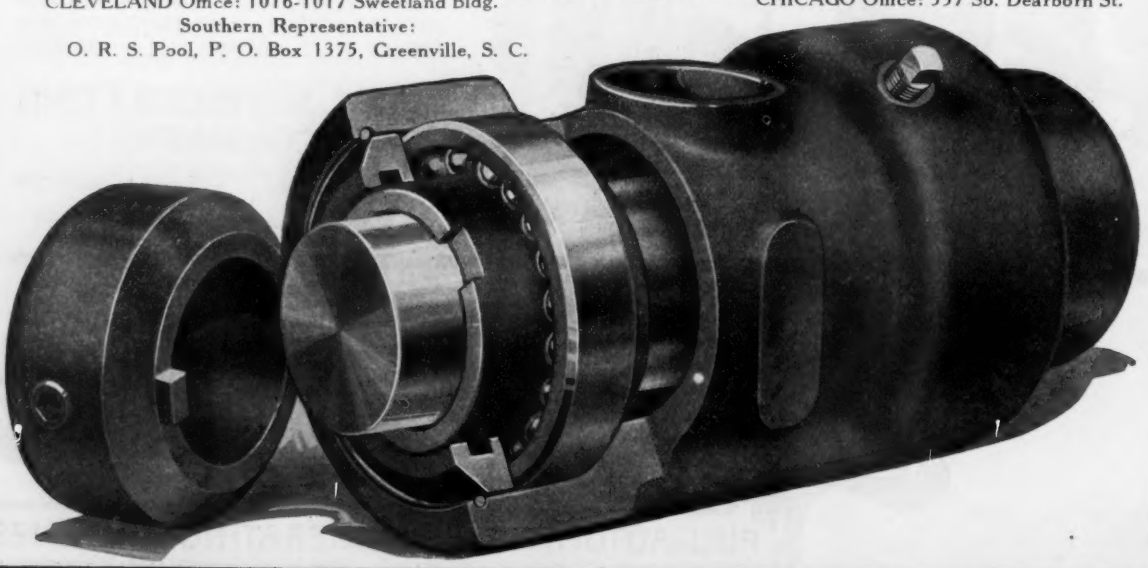
Conrad Patent Licensee

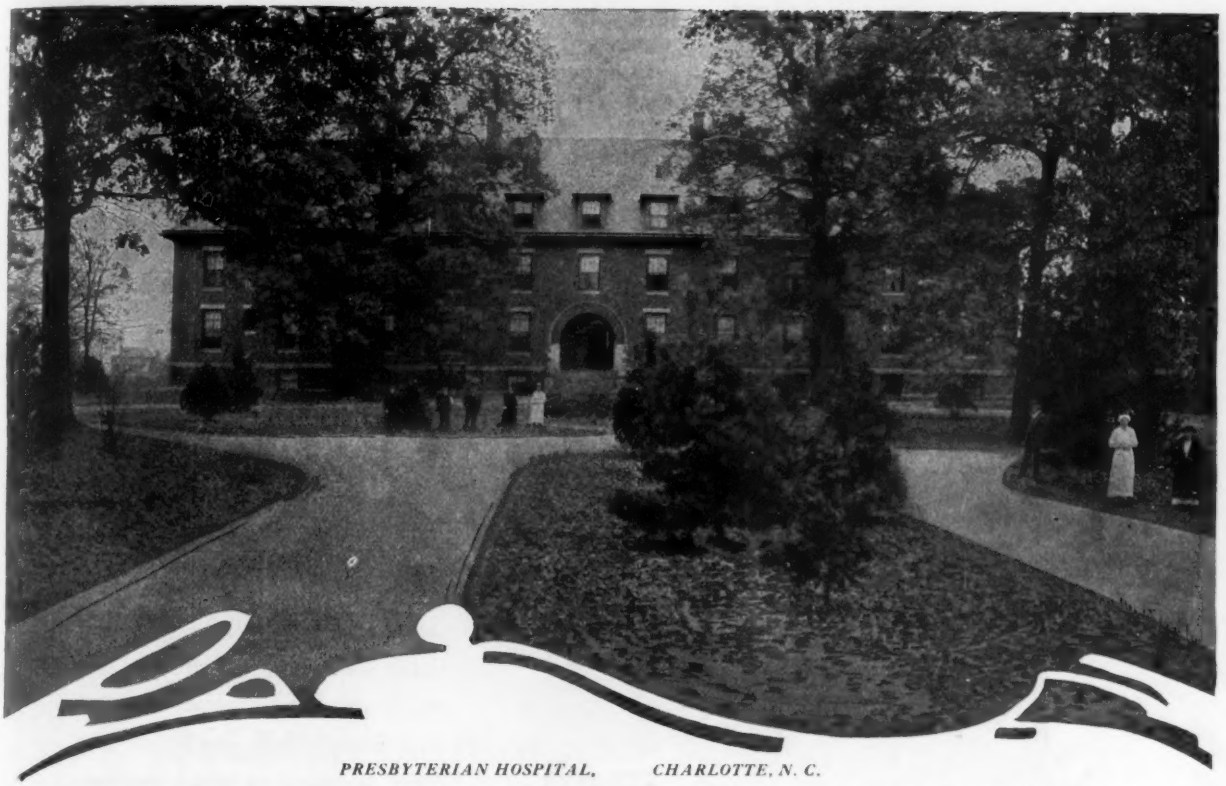
DETROIT Office: 725 David Whitney Bldg.
CLEVELAND Office: 1016-1017 Sweetland Bldg.

New Britain, Conn.

NEW YORK Office: 5 Columbus Circle.
CHICAGO Office: 537 So. Dearborn St.

Southern Representative:
O. R. S. Pool, P. O. Box 1375, Greenville, S. C.





PRESBYTERIAN HOSPITAL, CHARLOTTE, N. C.

MECHANICAL REFRIGERATION IN HOSPITALS AND COMMUNITY STORES

There is no better way to properly refrigerate your hospital and stores, cool milk, make ice, etc., than by installing "SOUTHERN" Ice and Refrigerating Machines.

The value of Mechanical Refrigeration in Hospitals and Community Stores is readily appreciated by textile mills all over the South. "SOUTHERN" Ice and Refrigerating Machines are especially suited for the Community Store, to cool meats, produce and other general supplies.

ECONOMICAL, EFFICIENT AND SANITARY

If the cost of refrigerating by ice exceeds $1.00 to $1.50 per day it will be more economical to use Mechanical Refrigeration. It will be found that the actual saving over the cost of ice will soon pay for the installation of modern Mechanical Refrigerating Equipment, to say nothing of the saving of food products, the longer life of cold storage boxes, and the clean, dry and sanitary refrigeration that will be obtained.

Southern

IMPROVED

ICE MAKING AND REFRIGERATING MACHINES

Write for full information.

SOUTHERN ICE MACHINE CO., CHARLOTTE, N. C.

Manufacturers of ICE MAKING, REFRIGERATING AND WATER COOLING MACHINES

SPECIALISTS IN MARKING MACHINES

Carton Marker

The Carton Marker is for printing the size, descriptive names or colors, style numbers, or lot numbers, on the carton or the label, giving an absolute uniform result on all your containers; eliminating the poor and blurry mark that is usually obtained by the use of hand stamps.

Over 500 of these equipments are in operation.

Is adapted for marking the set-up, folding or telescopic carton.

Price of standard equipment, $300.

Textile Marker

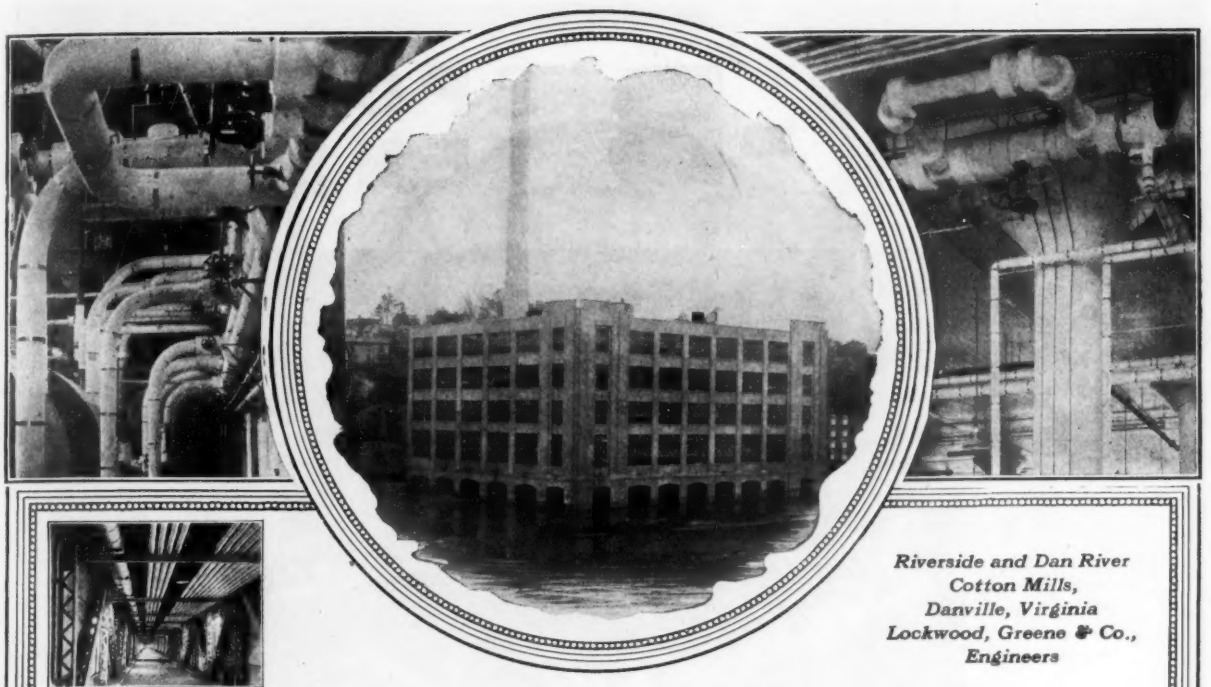
The standard Textile Marker designated as an M-5 equipment, is for placing identification marks on pieces before going into the dye, bleach and finish, or any other operation in which the material requires marks for identification purposes, eliminating any possibility of error or short measure. Gives you a true check on your yardage. Price for standard equipment, $300.

Coupon Marker

The Coupon Marker, used in connection with piecework pay-roll systems, where the coupon method is operated. Prints at the rate of 375 a minute. Has rotating type wheels which enable the operator to set various numbers at will, and is the solution for marking where this system is installed. There are over 400 of these in use.
Price of standard equipment, $250.

MARKEM MACHINE CO.

232 Summer St., BOSTON, MASS.



Riverside and Dan River Cotton Mills, Danville, Virginia Lockwood, Greene & Co., Engineers

Straddling the River Dan With Industrial Piping

In adding 5000 looms to their equipment the Riverside and Dan River Cotton Mills had to straddle 900 feet of the river Dan.

They straddled it with a bridge to connect the plants physically. They straddled it with power—and they also straddled it with pipe for heating, for fire protection and for industrial purposes.

Additions to one unit of production create demands on every other unit—back to the boiler room. More looms—more power; more looms—more slashers; more looms—more dyeing.

More power—more turbines; more turbines—more boilers; more pumps—more feed water heaters—more piping. Industrial piping in concrete structures means much in the way of pre-vision and planning; co-operation with owners, engineers and other contractors.

For fifty years industrial piping has been not only our business but our hobby. Long before we entered the humidifier field this organization was well and favorably known in textile centers as among the reliables in industrial piping.

New Weaving, Slasher and Finishing Building

Raw Stock Dye House and Power Plant

The industrial piping in this project involved a sum sufficient to have built a 50,000 spindle yarn mill a few years ago

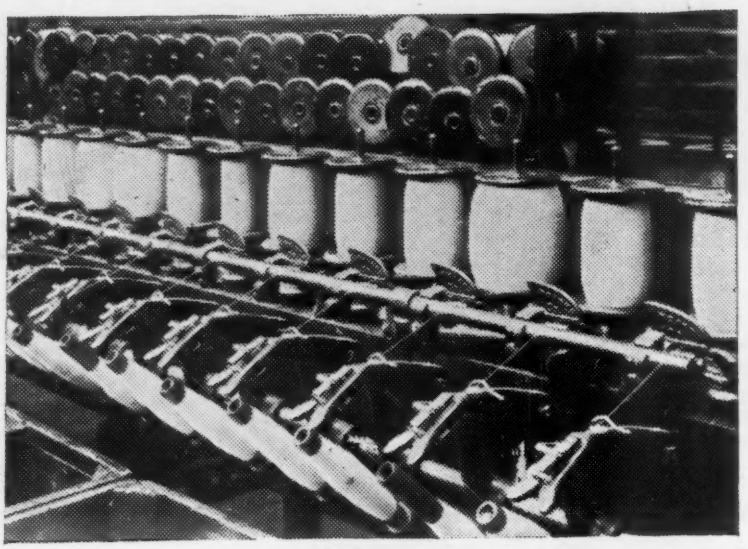
Parks-Cramer Company

Engineers & Contractors

Industrial Piping and Air Conditioning

Fitchburg Boston Charlotte

L-V-B SPOOLER TENSION



L-V-B Tension Device in New Bedford Mills.

Here's What One Mill Saves

In a mill that changed from warp to filling wind on 20,000 lbs. production, the following result was obtained:

Warp Wind	Filling Wind
Stick Waste 80%	Stick Waste 60%
Spooler Waste 200 lbs.	Spooler Waste 50 lbs.
1050 doffs.	650 doffs.

Increased production 5% due to less doffing and less breakage.

Changed warp bobbins 7 15/16 to filling bobbins 8¾".

Increased speed of spooler from 800 R.P.M. to 1200 R.P.M.

Illuminated 1/3 of spoolers; also improvement on slashing and weaving.

Change from Warp to Filling Wind. Try it out at our expense.
Send 2 filled bobbins and we will forward sample tension on approval.
The L-V-B Spooler Tension means greater production, better spinning and 50% Saving in Waste. Ask for a list of mills that are using L-V-B Tensions.

ADDRESS

Textile Specialty Company

P. O. Box 255, New Bedford, Mass.

A. B. Carter, Southern Agent, L-V-B Tension Co., 210 Realty Bldg., Gastonia, N C.

STAFFORD

AUTOMATIC LOOMS

For Wide Sheetings

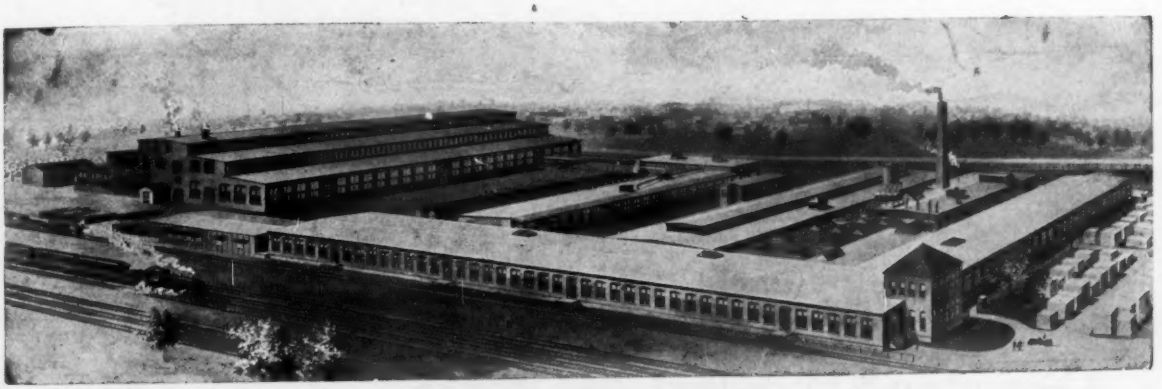
The Stafford broad loom is built to withstand severe service. Its simplicity, accessibility of parts and ease of operation are a few reasons why it is used by some of the most representative wide goods mills.

This loom embodies the high weaving qualities that characterize other Stafford looms and it can now be supplied with either shuttle or bobbin changing automatic features.

THE STAFFORD COMPANY

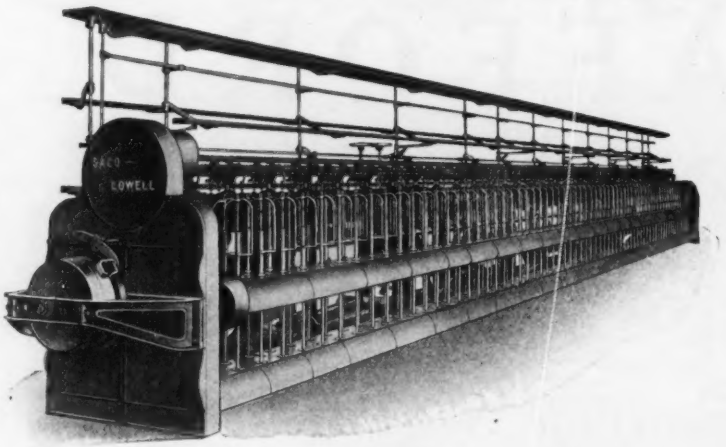
READVILLE, MASS.

Southern Agent, J. H. MAYES, Charlotte, N. C.



PLANT OF THE STAFFORD COMPANY, READVILLE, MASS.

SACO-LOWELL SHOPS
TEXTILE MACHINERY



Our Improved Roving Frames are economical to operate and give satisfactory service.

Slubbers, Intermediates, Fine Frames and Jacks for all counts of roving. Catalog on request.

EXECUTIVE OFFICES, 77 FRANKLIN STREET, BOSTON, MASS.

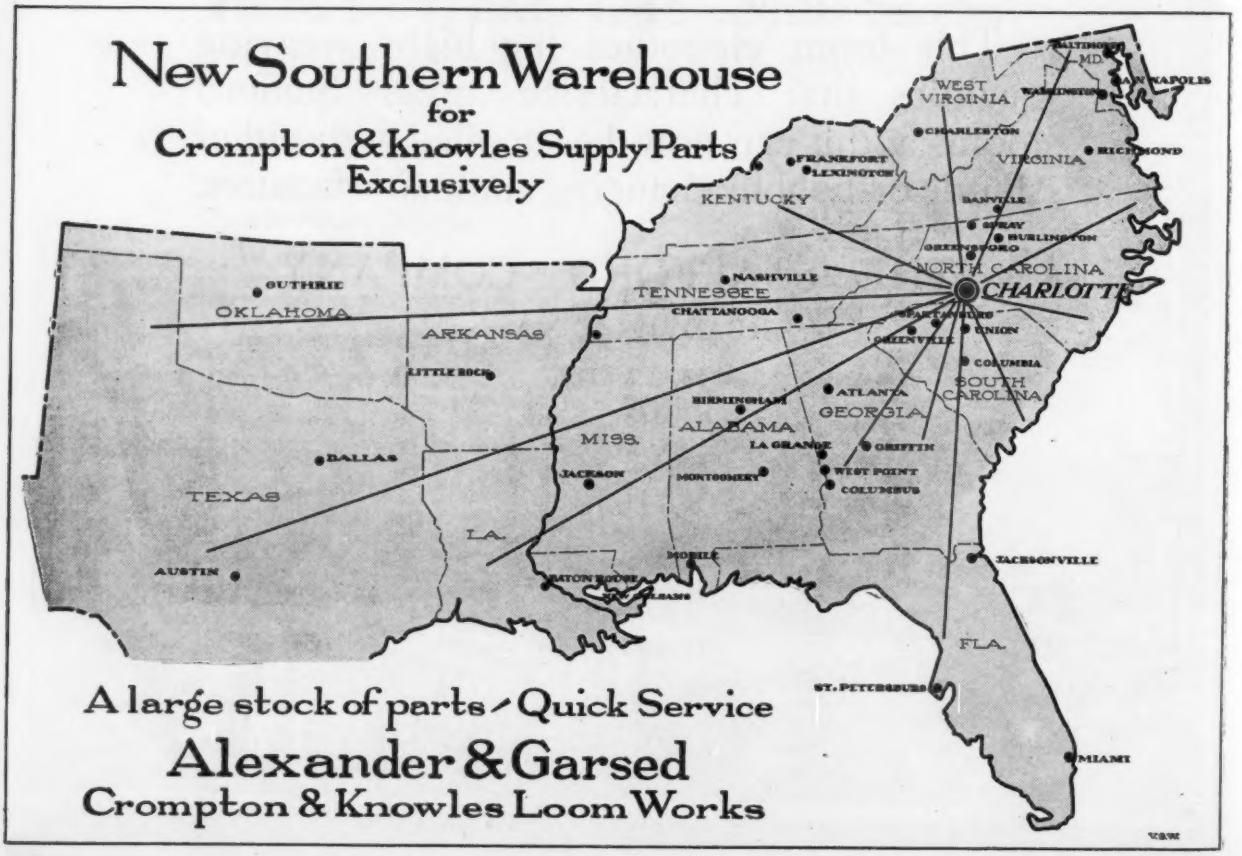
SHOPS AT

LOWELL, MASS. NEWTON UPPER FALLS, MASS. BIDDEFORD, MAINE.

ROGERS W. DAVIS, SOUTHERN AGENT, CHARLOTTE, N. C.

SOUTHERN BRANCH OFFICE, GREENVILLE, S. C.

New Southern Warehouse
for
Crompton & Knowles Supply Parts
Exclusively



A large stock of parts - Quick Service

Alexander & Garsed
Crompton & Knowles Loom Works

The new "S-B-C" Picker Stick

Here is a new stick that will not absorb any moisture, it will hold its shape, it is made from good heavy hickory, it is sold on an unqualified guarantee, and the price remains the same.

The "S-B-C" Picker Stick is the result of many tests and experiments. It is made to meet the demand for more satisfactory sticks, ones which give you better value for your money.

The two principal distinguishing features of this stick are:

(1) It has been soaked in a special preparation which goes right into the wood and preserves it—sort of lubricates it, you might say. It reduces wear, and keeps the stick in perfect condition for an indefinite time under varying conditions. No moisture can get into the "S-B-C"—this preparation sees to that. You can store this new stick away most anywhere, and know it will be all ready for you when you need it. The stick is in perfect condition when it leaves our plant, and it stays that way until you put it into service.

(2) There are ten different varieties of hickory, and Government timber experts helped us to decide which kind is best.

And in the "S-B-C" you will find all the details of manufacture which go to make up an excellent stick.

This new stick is now ready for you in any quantity—in fact some of the mills are already using it.

Tear off the coupon below and learn how you can get better picker-stick value for the same money.

Southern Bending Company

Johnson City, Tenn.

Southern Bending Co.

Johnson City, Tenn.

Make up some sample "S-B-C" Picker Sticks like the one we are mailing you. Send these to us prepaid. We will soon be in the market for.....sticks. Tell us what your price is on that number, and let us know about your special introductory offer.

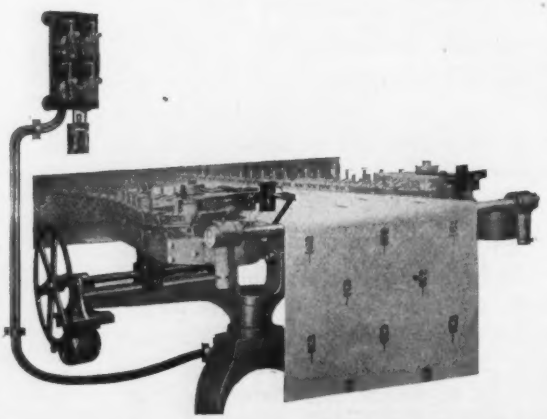
..... By.....

Address .....

C-3-22

The Schwartz AUTOMATIC ELECTRIC GUIDER (PATENTED)

For Straight and Swing Tenter Frames and Wool Dryers



A Labor Saving Investment

To be a real labor saving and paying investment, a tenter frame guider must be automatic, require no attention and handle the most delicate cloth without injury.

The operation principle of the Schwartz Automatic Electric Guider is different from any other guider on the market, which principle is responsible for its dependable and trouble-proof operation—

it slides the wings of the tenter to meet the cloth instead of moving the cloth to meet the wings.

The cloth runs absolutely free and unhindered—the Schwartz is the only guider that will handle the most delicate fabric without injury.

No rollers, brushes, valves or other troublesome parts found in other guiders. It is always automatic, requires no attention, and is trouble-proof.

Ask today of Dept. G., for full information.

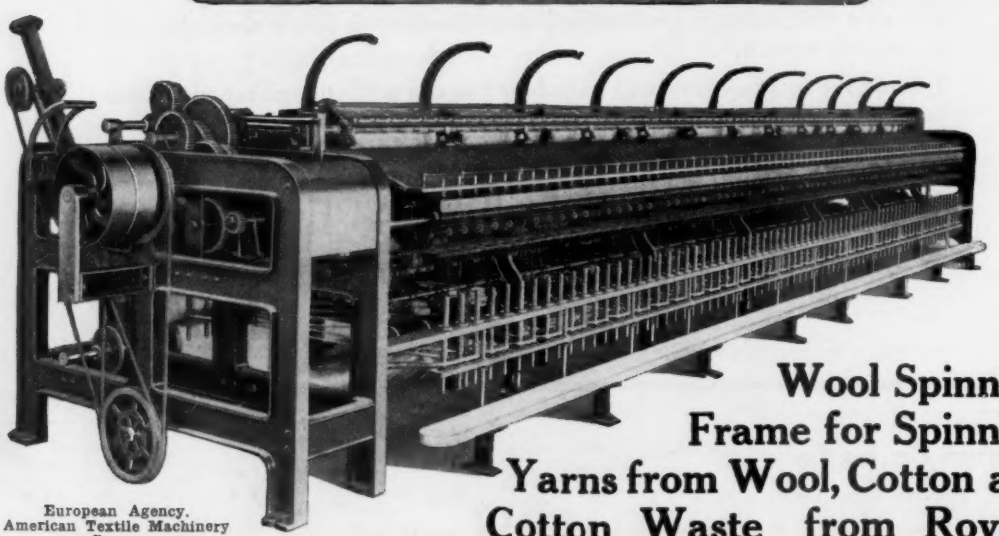
BLAKE ELECTRIC MFG. CO.

1 ROWES WHARF, BOSTON, MASS.

WHITIN MACHINE WORKS

ESTABLISHED 1831

TEXTILE MACHINERY



European Agency.
American Textile Machinery Corp.,
47 Avenue De L'Opera,
Paris, France,

Wool Spinning Frame for Spinning Yarns from Wool, Cotton and Cotton Waste from Roving made on the Condenser System

MAIN OFFICE AND WORKS

WHITINSVILLE, MASS., U.S.A.

SOUTHERN OFFICE CHARLOTTE N.C.

LUNKENHEIMER
"Clip" Valves

ALL IRON
Screw Ends, Fig. 319.
Flange Ends, Fig. 318.

IRON BODY
BRONZE MOUNTED
Screw Ends, Fig. 600.
Flange Ends, Fig. 638.

The success of "Clip" Gate Valves is the direct result of their durability and the resultant economies in maintenance demonstrated in thousands of installations. The simplicity of the design, the wide range of sizes and the material combinations available, peculiarly fits them for standardization on lines carrying pressures up to 100 pounds.

Sizes ½ to 6 inches in Iron Body Bronze Mounted and in "All-iron"; in two types, Inside Screw Rising Stem and Quick-opening Sliding Stem. The "All-iron" pattern is particularly adapted for use with Ammonia Liquor and other fluids which attack br ıze alloys.

Lunkenheimer Distributors situated in every commercial center carry Lunkenheimer Products for immediate delivery. Specify Lunkenheimer "CLIP" Gate Valves and insist on getting what you specify.

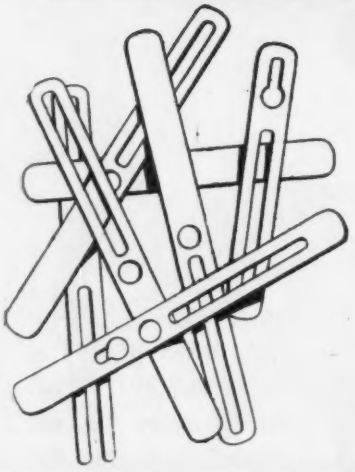
Write for catalog No. 58-AK.

THE LUNKENHEIMER CO.
"QUALITY"
LARGEST MANUFACTURERS OF
HIGH GRADE ENGINEERING SPECIALTIES
IN THE WORLD
NEW YORK CHICAGO **CINCINNATI, U. S. A.** BOSTON LONDON
EXPORT DEPT., 129-135 LAFAYETTE ST., NEW YORK

AMERICA'S BEST
LUNKENHEIMER
QUALITY
SINCE 1862

5-16-10

GREIST



Satin Finish Loom Drop Wires
are *Good Wires*

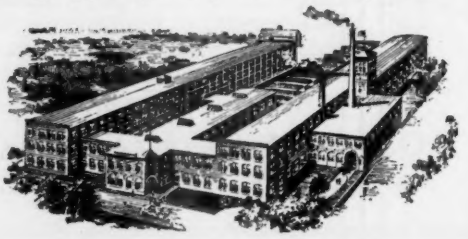
Uniformly made—free from burrs
a reliable source of supply.

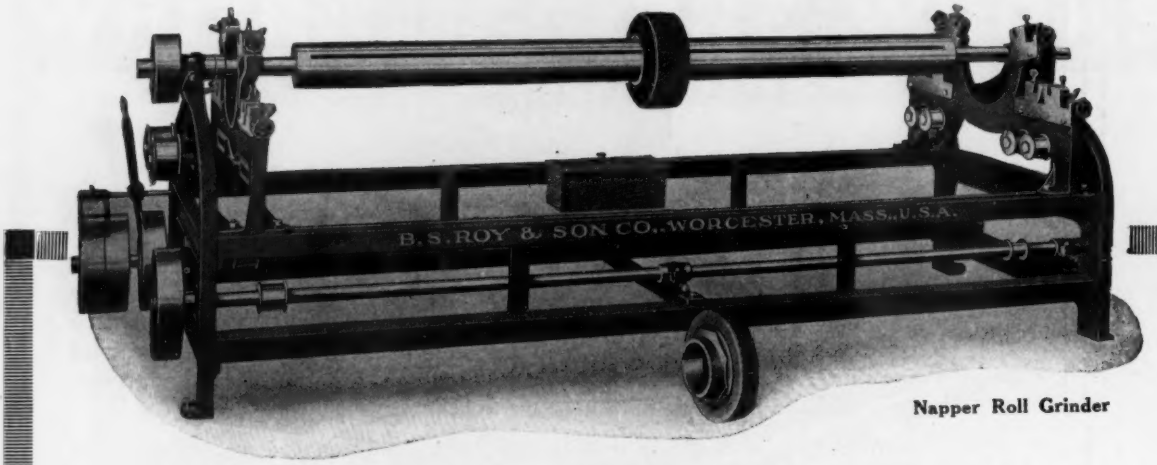
The Greist Manufacturing Company, Dept. C., New Haven, Conn.

New England Representative:
Boyd's Textile Bureau
F. W. Boyd, Manager,
339 Butler Exchange,
Providence, R. I.

Southern Representative:
The G. G. Slaugter Machinery Company,
Greenville, S. C.

Fall River and New Bedford:
Coldwell Gildard Company
108 Hartwell St.,
Fall River, Mass.





Napper Roll Grinder

For Every Textile Grinding Need

Roy Grinders are made for every textile mill use and for textile mill use only. In the Roy Line are machines for Grinding Cotton Cards, Nappers and Calender Rolls.

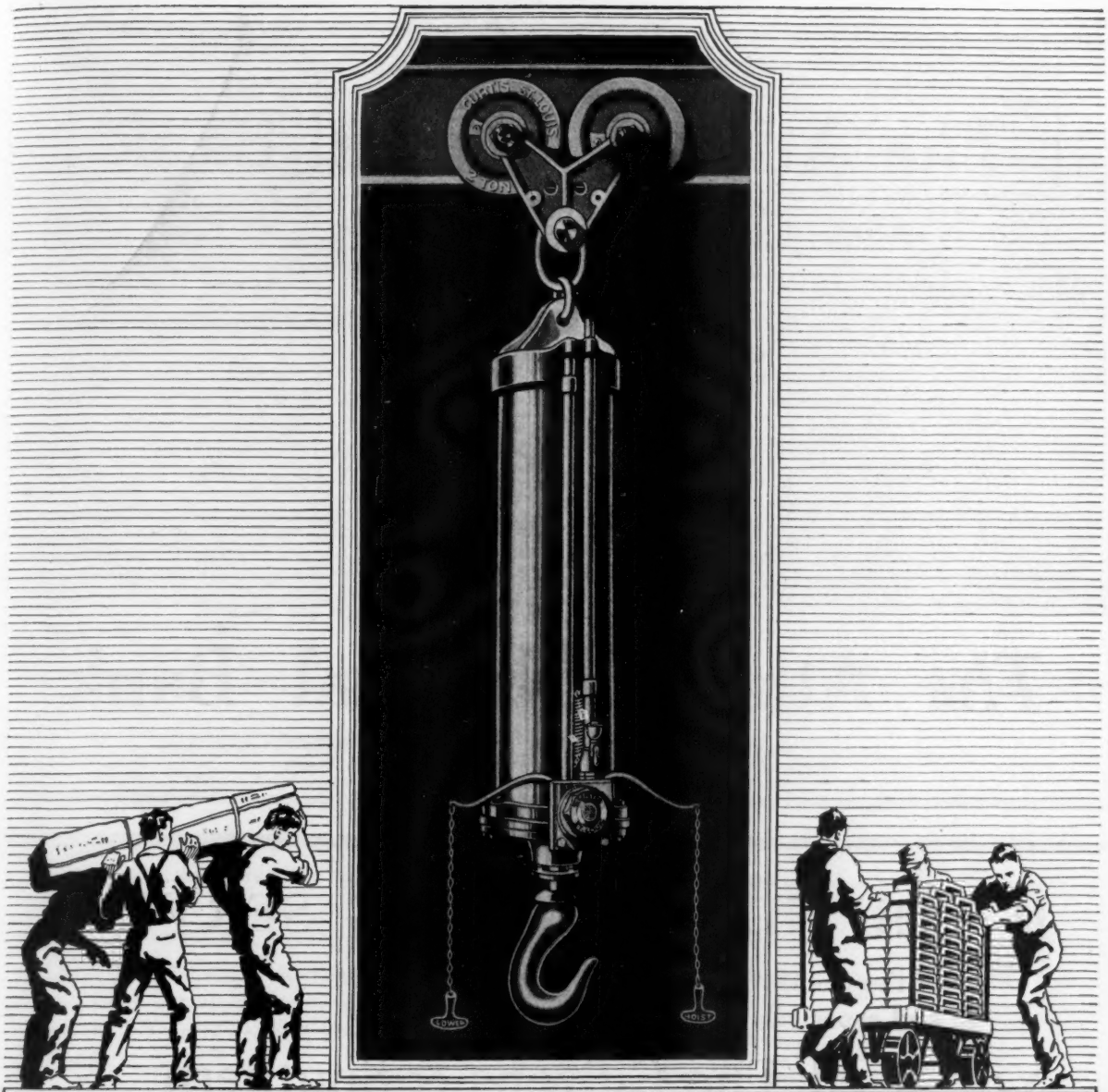
We will gladly give you full details. Write for Descriptive Bulletins.

B. S. Roy & Son Co., Worcester, Mass.

ESTABLISHED 1868

E. M. TERRYBERRY, *Southern Agent*
1126 Healey Bldg., Atlanta, Ga.

Canadian Representative
W. J. WESTAWAY CO. LTD.,
Hamilton, Ontario



CURTIS AIR HOISTS and TROLLEYS
SAVE MAN-POWER

CURTIS Trolleys are constructed with self-equalizing steel side frames and large inclined wheels fitted with shock-absorbing Flexible Roller Bearings — making them easy to start — easy rolling and long lasting.

CURTIS All-Steel Air Hoists, in design and construction, present the perfected results of 25 years of manufacture. They are simple, safe and economical for light and medium loads. Capacities, 800 to 20,000 lbs.

CURTIS PNEUMATIC MACHINERY COMPANY

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The Wisdom of Age
With the Vigor of Youth

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FIFTY-SEVEN YEARS, of successful banking finds the Atlanta National as CONFIDENT of ATLANTA'S FUTURE as when it first opened for business, just after the close of the Civil War and when the city was in ashes.

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A COMMERCIAL BANK—PERFORMING EVERY FUNCTION OF A BANK

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IF YOU NEED BANKING SERVICE

in the South,
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Capital and Surplus $4,500,000

The Citizens & Southern system has completely equipped offices in Atlanta, Savannah, Macon and Augusta.

Each of these offices is connected with the others by direct private wires.

If you are a customer of either office, and want information or service of any kind from the other cities these wires and the complete organization are at your service.

Hundreds of direct correspondents all over the South make it possible to give you practically the same service wherever you want it.

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"No account too large, none too small"

Forging the link between East and West Coasts

NEW ENGLAND'S relations with the Pacific Coast began in 1788. In that year Capt. Robert Gray, a Boston fur trader seeking new territory, discovered the great river which bears the name of his ship, the *Columbia*. It was this exploration that decided the disputed international boundary line favorably to the United States half a century later.

Likewise pioneering to establish a broader commerce, The National Shawmut Bank established direct connections in the Pacific Coast cities many years ago. These insure fast banking service and save days and dollars for our clients—most important savings now that business is on a basis of strict competitive economy.

Nature endowed the Pacific Coast states lavishly with natural resources, whose products find ready sale in less fortunate New England. And vice versa, this great industrial beehive—New England—manufactures exceptionally good machinery, shoes and belting, textiles, paper and rubber goods that must meet exactly the needs of the land of golden sunsets.

America's maritime revival, quick passage via the Panama Canal and the growing importance of Boston and Pacific Coast ports, forecasts the renewal of coast-to-coast trading by the cheap all-water route, as in the late forties. The National Shawmut Bank—*the bank that is closest to the heart of New England's Industry*—is ready at all times to assist in finding a new market for worthy goods.

Correspondence is invited.

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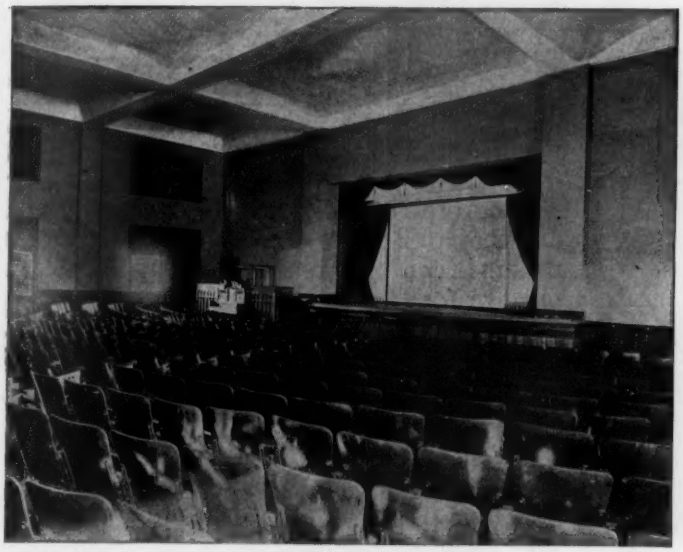
Our service to the textile mills is the result of years of experience in installing textile theatre equipment. Our representatives call upon the mills personally, lay out the plans, advise on the proper equipment required and finally supervise the installation and the starting of the theatre. In other words, they take the whole problem off from your hands and do not turn over the work to you until the theatre is operating satisfactorily.



A Typical Textile Mill Theatre.

The textile industry is demanding the best moving pictures for their employees and that is why they regularly specify

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That is why more Power's Projectors are used by textile mills in the South than all other projectors combined.

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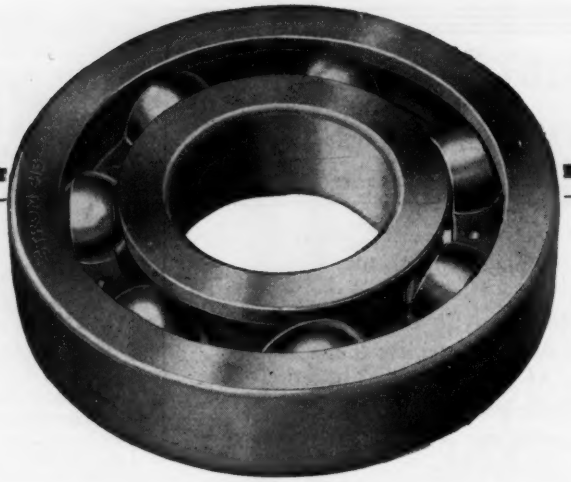


Put Your Slasher Cylinders On Ball Bearings

The old-fashioned, plain rollers on which the cylinder journals are mounted, pull hard, and place a heavy load on the yarn that may stretch it badly. Stretched yarn weaves poorly, and cuts down production.

These old style rollers can be replaced in a few minutes with ball-bearing-equipped rollers. It is not even necessary to take the yarn off to do it. The ball bearings lighten up the load so that there is no tendency to stretch the yarn.

Plain rollers require constant and careful oiling. If they get dry they pull hard. Ball bearing rollers require greasing about once in four or five months, and they always run the same way—smoothly and easily, so that there is a uniform tension in the yarn, yet this never reaches the stretching point.

Rollers equipped with Strom bearings are manufactured for any make of slasher.

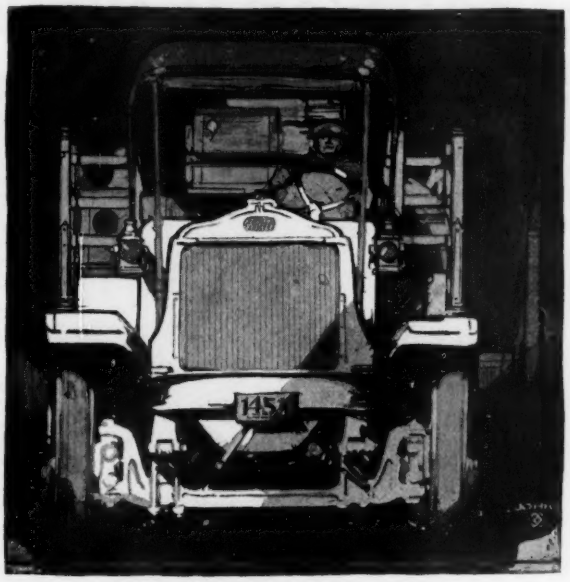
For complete information on textile machinery applications write to the Aldrich Machine Works, Greenwood, South Carolina.

U. S. Ball Bearing Mfg. Co.

(Conrad Patent Licensee)

4544 Palmer St. Chicago, Ill.

Strom BEARINGS



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$180,000,000 worth in active service—by far the largest total investment in a single make

5-ton	$4,500
3½-ton	4,200
2-ton	3,250
¾-ton	2,400

F. O. B. Factory

THE WHITE COMPANY
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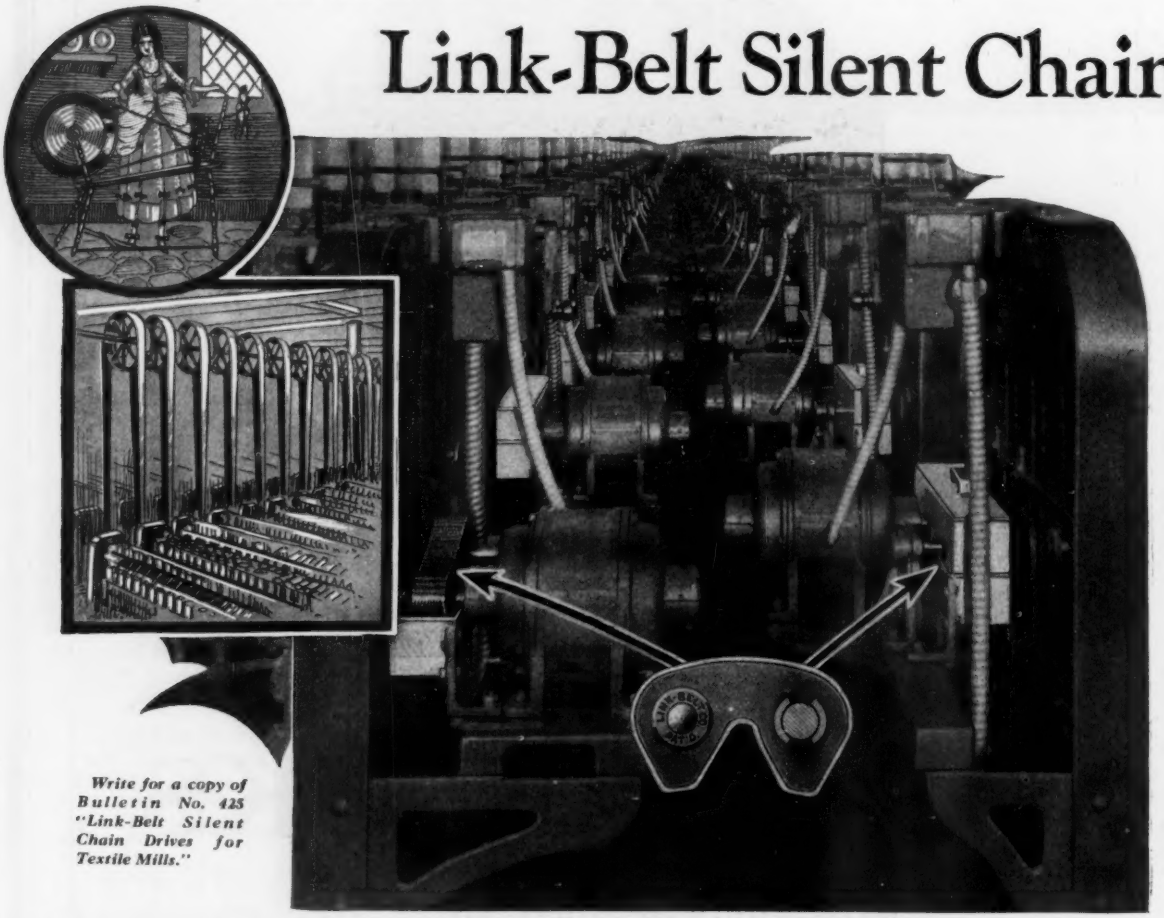
21 YEARS OF KNOWING HOW

From Hand Power to Link-Belt Silent Chain



Write for a copy of Bulletin No. 425 "Link-Belt Silent Chain Drives for Textile Mills."

IN THE days of the old spinning wheel, hand power turned the wheel that spun the yarn. Just as this primitive form of power gave way to steam power, applied by belting, so is the latter rapidly making way for the greater efficiency, economy and dependability of electric power transmitted through Link-Belt Silent Chain Drives.

The lessons of the past show that if a manufacturer is to be successful he cannot cling to wasteful, obsolete methods, while his competitors, wide-awake to the march of industrial progress, adopt new methods that mean a better product at a lower cost of manufacture.

The use of Link-Belt Silent Chain Drives is not limited to spinning frames, but is suitable for a wide variety of textile mill drives.

824

LINK-BELT COMPANY

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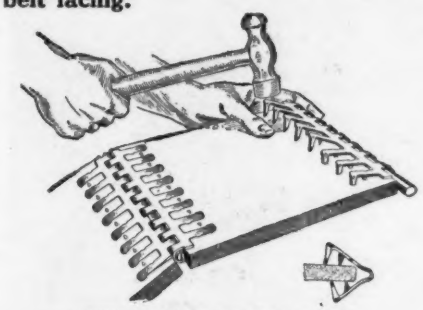
Time-tried and Powerful

A dominating factor in every industry, where belt driven machinery regulates the output, is **the belt lacing.**



Nothing needed but a hammer to apply it—and you already have a hammer.

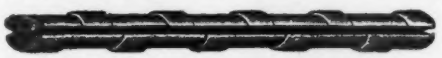
The belt joint, in reality, is an important connecting link between profit and loss. It carries the belt over and under and around the pulleys, bearing the weight of machinery overloads.

With Alligator Steel Belt Lacing, **positive** belt power is assured with the **minimum** of slow downs or stops which **means** full value secured from machinery and men—**profit protection for you.**

Investigate Alligator Steel Belt Lacing — and employ it now before further time loss occurs. Before someone says "Why don't you use Alligator?" Then you'll be sure of your belts' efficiency—joined properly and securely with "The World's Strongest Belt Lacing."

Used Satisfactorily On All Sizes of Belting

A shop foreman will feel that "Alligator" is **his** lacing, made just to meet his conditions. A knitting mill will use "Alligator" as its special ally. A brick and clay plant will feel secure with "Alligator" on its pug mill and other drives. A printer will search his town for baby "Alligator" for his tapes. A mining engineer will hail "Alligator" for his crusher drive as well as his lighter belts.



Rocker pin makes possible the use of a hinge belt joint in damp places and under heavy loads where a rawhide pin will not stand up.

Industrial engineers acclaim "Alligator" as their Lacing because of its wide range of utility.

Simple, Rapid, Efficent

As illustrated, only a hammer is required to apply Alligator Steel Belt Lacing. Anyone can do it and in an average time of three minutes. There is a size for every belt from tape up to five-eights inch thickness.

And "Alligator" lacing is scientifically correct. In the accompanying illustration, see how the teeth penetrate the belt lengthwise of the pull in order not to cut the belt cross-wise. This leaves the long burden bearing grain or fibres intact—no holes punched, no injury to belt ends. The result, longer steadier service from belting, which means lower upkeep costs—an item worth the utmost consideration.

Actual size of No. 25 Alligator for single leather or 4-ply fabric 3-16 to 9-32 thick. Note double staggered teeth.

Recommended by Good Belting Manufacturers

The first belting manufacturers to recommend "Alligator" some years ago were those who realized that it made the most tenacious joint. A strong testimonial. Others followed, until today, the leading manufacturers of good belting recommend it.

Investigate "Alligator"

If you happen not to use Alligator Steel Belt Lacing, let us send you a sample joint, our literature and information of a convenient source of supply. Use the coupon.

FLEXIBLE STEEL LACING CO.

4619 Lexington Street : Chicago, U. S. A.

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Gentlemen: Kindly send a made up sample of Alligator Steel Belt Lacing, your descriptive literature and indicate a convenient source of supply.

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Address.....

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Name of Inquirer.....

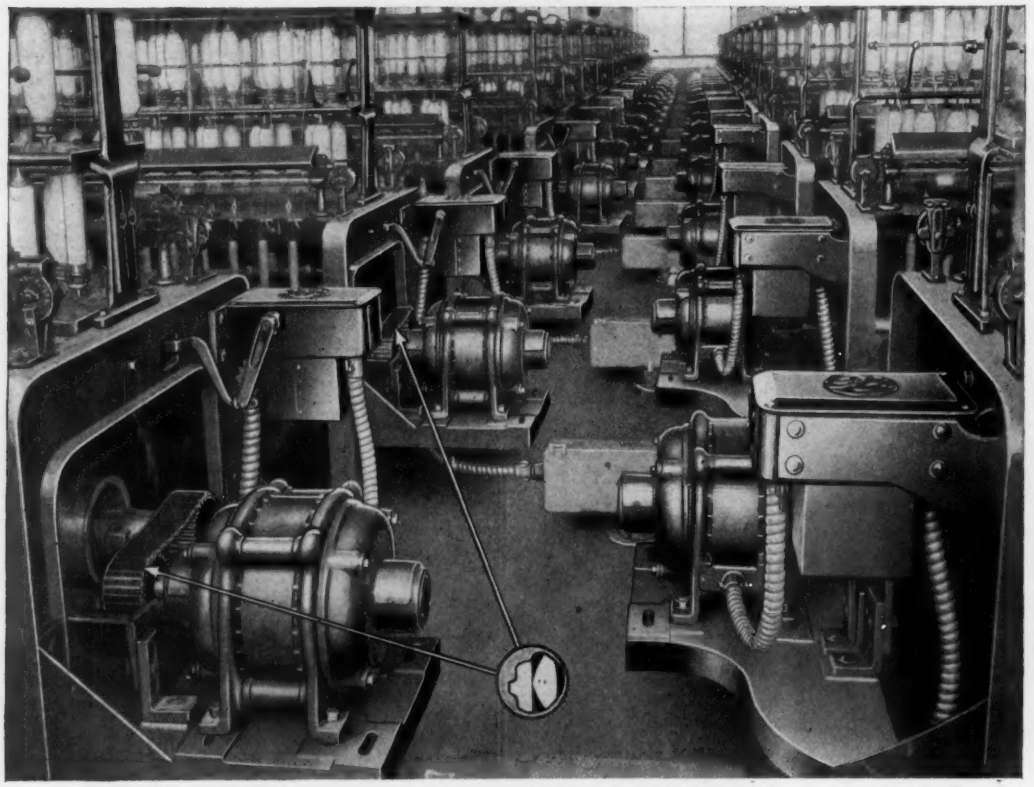
ALLIGATOR

TRADE MARK REG. U.S. PAT. OFFICE

STEEL BELT LACING

MORSE SILENT CHAIN DRIVES

THE MORSE "ROCKER JOINT"



Efird Mill No. 4.

Installation made in 1916

In equipping No. 5 mill in 1920 Morse Chains were specified.

the following are the results being obtained:

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(2) Uniform twist.
(3) Fewer ends down.
(4) Better lighting and decreased fire risk through elimination of belts.
(5) Decreased labor cost, one operator being able to handle more sides.

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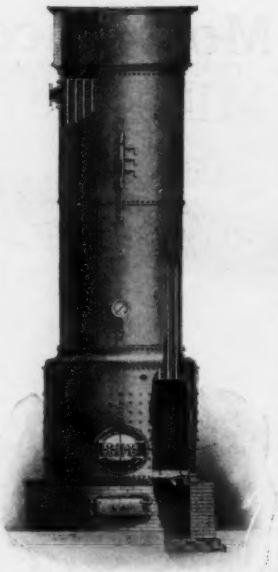
POWER TRANSMITTING MACHINERY

The High Pressure Boiler That Saves Fuel, Floor Space and Labor

The vertical tubular type of boiler has long been preferred by the "old heads" in the steam plant, especially in the New England States, because with this type of boiler there is less floor space required, less grate surface and less fuel required.



Lately there has been an increased demand for this type of boiler due to the call for higher steam pressures and also to the increasing use of steam turbines requiring superheated steam for their economical operation.

These Vertical Tubular Boilers combine all the best features of the Vertical Tubular Boiler. In the arrangement of heating surface, grate surface and passage of gases we have embodied in our design proportions which practice has proven correct.

The illustration shows our Standard Manning Type. Provision is made for cleaning the crown sheet through a series of handholes arranged to come opposite alternating rows of tubes so that it is possible to reach every part of the sheet.

We build vertical tubular boilers in the Straight Shell type and the Tapered Course Type, both of which are perfected to the last degree and are giving satisfaction to every user. They are built to meet all the rigid requirements of the Massachusetts Board of Boiler Rules, and the ASME Code. Materials and construction live up to the reputation of all International products.

We also manufacture Horizontal Return Tubular Boilers, Water Tube Boilers, Brady Scotch Boilers, Smith Door Protectors, Macdonald Shaking Grates, Special Plate Work, etc.

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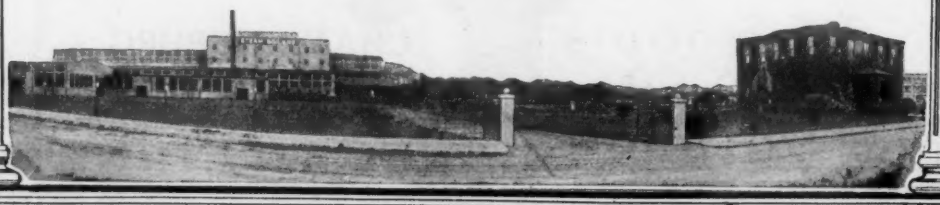

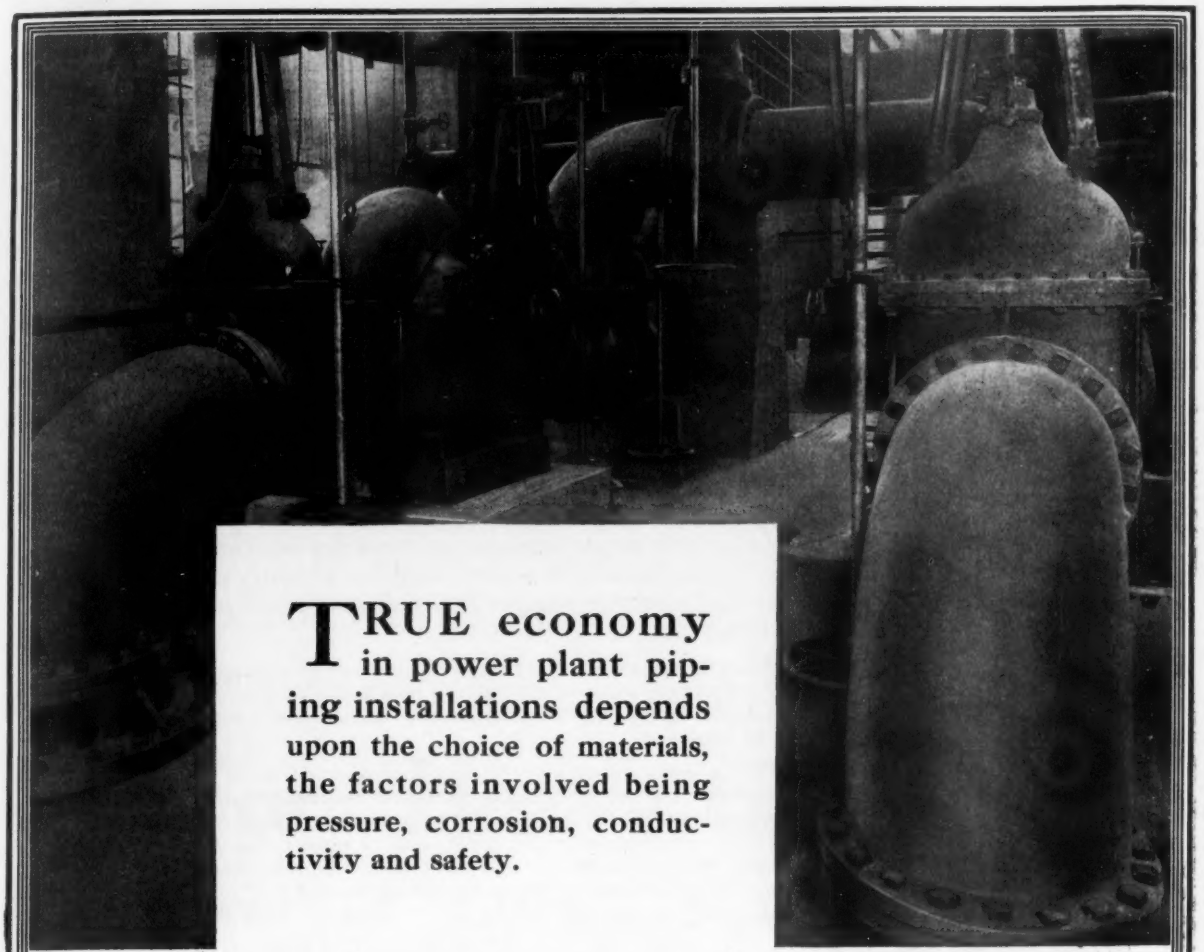

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insures proper design, correct fabrication, higher steam velocities by the use of smaller pipes; thus reducing the initial cost, lowering heat losses and insuring plant reliability and safety.

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THE FUNCTIONS OF THE ENGINEER

The Textile Industry

the Most Profitable Field of Manufacture

The most profitable three classes in the business field are in order of their rank:— Banks, Insurance Companies and Textiles.

Federal reports show that 40% of corporate businesses are without net income. Approximately 93% of all banks, 82% of all insurance companies and 80% of all textile mills show net incomes.

Banks and insurance companies cannot be properly classed as industries, so it is evident that the industry showing the highest average prosperity is engaged in the manufacture of textiles.

While it is apparent that this industry offers an unusually high grade of investment for new capital, the maximum returns to the manufacturer cannot be obtained unless his plant is properly planned and equipped.

This is really the task of the Engineer who is trained to balance all the factors which affect successful and economical operation. The location and plan of the mill, the design and position of machines, the correct generation and application of power, the distribution of light, the conditioning of the air and a hundred other factors are of vital importance to insure the fullest success.

These are Engineering problems.

In further discussion of this subject we have prepared an interesting book, "Picks to the Minute." Where shall we send your copy?

J. E. Sirrine & Company

Engineers

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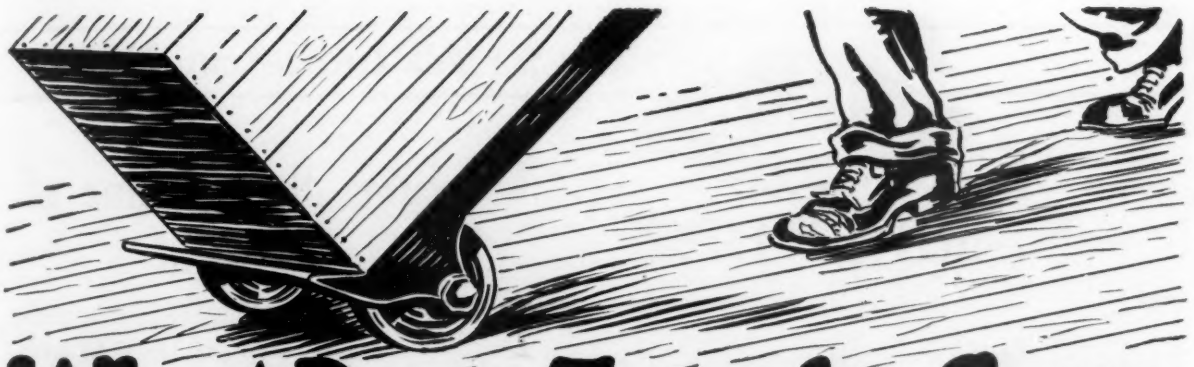

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for the hard knocks which heavy loads and heavy shoes impose on a "Tupelo" floor? "'Nary a care!"

For "Heavy Going"

"a-wheel" or "a-foot," Tupelo floors in Textile Mills, Factories and Warehouses seem to actually grow solider and smoother as they grow older. Nature has supplied

TUPELO, the "Hard-Wear" Lumber

with a closely "knitted" or involved grain, which accounts for its non-slivering, non-splintering and long-wear characteristics.

For *all* the Tupelo facts—please write—*and you can't lay a floor quite* right *until you do.*

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J. B. Farnum Co.

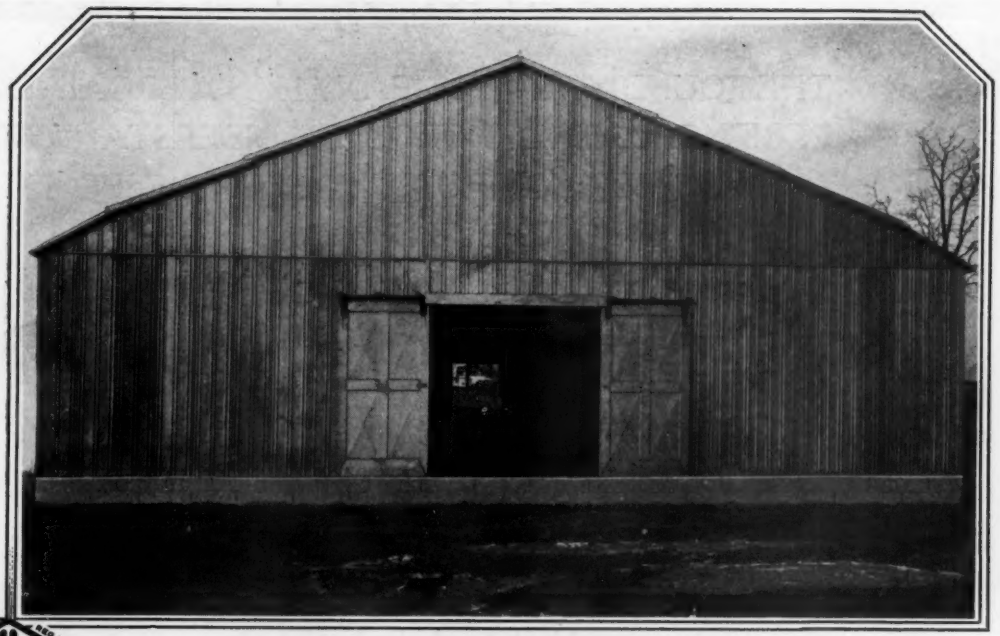
Magnifies the Volume of Usable Light

To increase the volume of usable light in Textile Mills is a task worthy of OJACO Mill White.

Today, scores of OJACO Mill-Whitened interiors prove the performance to be equal to the task. Daylight formerly absorbed in shadows cast by murky walls and ceilings is now REFLECTED—shedding its rays in soft, unglaring brilliance.

OJACO Mill White intensifies every ray of usable light. As smoothly white as alabaster, it abhors darkness and dinginess. At a cost surprisingly low, it assures more and better production.

Oliver Johnson & Co., Inc.
Paint Makers
Providence, R. I.



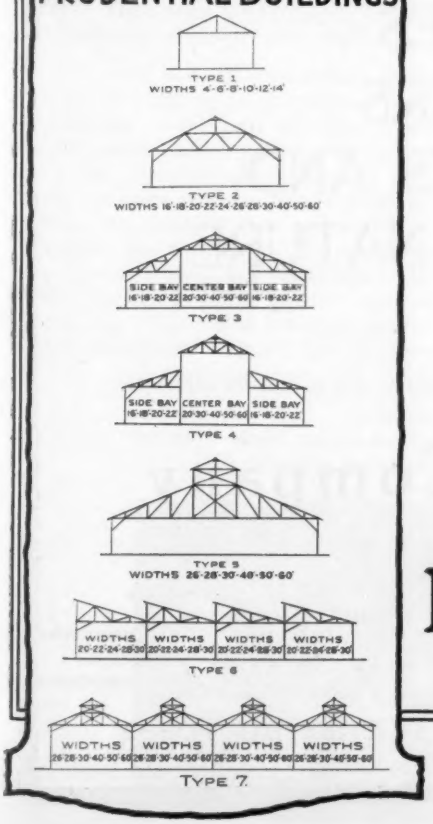
TRADE MARK REG. U.S. PAT. OFFICE

BLAW-KNOX

Select Your PRUDENTIAL Building

Low in Cost—Fireproof and Leakless

Types and Sizes PRUDENTIAL BUILDINGS



Fireproof, leakless, low in price—a combination hard to beat. There are hazards in every line including textiles. Inflammable textiles in raw or finished state are protected from external fire hazard by the surrounding STEEL WALLS of Prudential Buildings.

When you can obtain adequate housing for any textile storage as well as for actual manufacturing or other purposes—by the combination of all-steel construction and low cost—there no longer remains a logical reason for the use of wooden or other non-fireproof buildings.

Prudential Buildings are shipped in standard sections all ready for erection—steel sash, ventilators, skylights, doors, etc., are standard and can be furnished as desired.

Allow us to survey your building needs and recommend the right building for you. Build *at a saving*.

BLAW-KNOX COMPANY

629 Farmer's Bank Bldg., Pittsburgh, Pa.

New York	Baltimore	Chicago	San Francisco
Boston	Birmingham	Detroit	London, Eng.

PRUDENTIAL STEEL BUILDINGS SECTIONAL

THE FOUNDATION COMPANY HAS A BROAD EXPERIENCE AND A THOROUGH UNDERSTANDING OF ENGINEERING PROBLEMS AND IS ESPECIALLY QUALIFIED TO BUILD:

DAMS
BRIDGES
TUNNELS
WHEEL PITS
TAIL RACES
RAILROADS
PAPER MILLS
POWER HOUSES
HARBOUR WORKS
INDUSTRIAL PLANTS AND
BUILDINGS OF EVERY NATURE

The Foundation Company

ATLANTA

NEW YORK	SAN FRANCISCO	MONTREAL, CANADA
NEW ORLEANS	LOS ANGELES	PARIS, FRANCE
CHICAGO	PHOENIX	LIMA, PERU
PITTSBURGH	PORTLAND, ORE.	HAVANA, CUBA
DETROIT	VANCOUVER, B. C.	TAMPICO MEXICO

BUILDERS OF SUPERSTRUCTURES AS WELL AS SUBSTRUCTURES

An untouched photograph of a cloth room in a cotton mill, equipped with IVANHOE RLM reflectors and bowl-enameled MAZDA *lamps.*

The New Era in Textiles and Good Textile Mill Lighting

The textile industry hit the toboggan early. That was yesterday. Today, the industry is busy once more.

In this new era of prosperity, good lighting is playing an important part. It enables workmen to see more quickly and easily, and to see when mills are running idle. Thus it prevents spoilage and increases production. Also, good textile mill lighting increases the morale of the workers —a most important consideration today; makes possible proper sanitation of the plant; and prevents many minor accidents. These are production facts, demonstrated in many plants to the satisfaction of textile executives themselves.

Good textile mill lighting with IVANHOE RLM reflectors and bowl-enameled MAZDA lamps is playing its profitable part in mills in every textile center. Is it paying greater dividends to your stockholders?

Near you is an IVANHOE distributor who will be glad to tell you the facts about good textile mill lighting and what it will do for you. See him today, or write to us direct.

IVANHOE-REGENT WORKS of General Electric Co.
Cleveland, Ohio
"Ivanhoe" Steel Reflectors Lighting Glassware, Anderson Self-Adjusting Arms, and Illuminating Service.

"SERVICE TO LAMPS"

IVANHOE

GLASS SHADES - STEEL REFLECTORS

"NATIONAL" NEWS

Of Interest to Dyers and the Color Using Industries in General
Prepared by the National Aniline & Chemical Company, Inc.

WHAT SERVICE DO YOU DESIRE MOST IN DYESTUFFS?

Prompt Deliveries

"National" Facilities Take Care of That

One of the things that the textile manufacturer demands from dyestuff manufacturers is prompt delivery of his requirements.

This can be guaranteed only when an extensive study has been made by the dyestuff manufacturer of the needs of the textile trades, and when he has balanced his manufacturing processes so that he has on hand, at all times, a sufficient supply of stock to meet all probable requirements.

The National Aniline & Chemical Company, Inc., has made this study and carries a supply of dyes in its warehouses and branch offices which enables it to promptly fulfill all requirements.

NATIONAL ANILINE OIL and ANILINE SALT

For Oxidized Blacks

Dyers of cotton hosiery will find these "National" products particularly dependable because of their uniformity in strength and quality.

Established standards based on scientific selection of raw materials and careful balance in manufacturing processes assure unvarying quality in every shipment.

Product samples may be obtained on request from any of our branch offices.

NATIONAL INDIGO 20% PASTE

Standard in Shade and Strength for Immediate Delivery

Stock for Southern Cotton Mills carried at our Charlotte, N. C., warehouse for prompt shipment.

"THE NATIONAL"

The National Aniline and Chemical Company, Inc., is the oldest and largest manufacturer of coal-tar dyes in America.

It produces over 250 dyes of absolute merit and supplies the requirements of the textile manufacturers in the dyeing of all classes of fabrics.

It has an unexcelled force of chemists and engineers for the development and progress of the art of dyemaking in this country.

It has a staff of colorists ready to serve textile mills in the correct application of dyes in fabrics, and this service is therefore in the interest of the ultimate consumer.

LABORATORY EQUIPMENT

The National Aniline & Chemical Company, Inc., maintains laboratories equipped with every modern facility and an experienced sales and technical staff which are placed, without obligation, at the disposal of its customers in all parts of the world; thereby rendering a personal service that receives universal recognition.

TWO NEW SULFUR BLACKS

National
Sulfur Black R

A red shade Sulfur Black of excellent solubility in comparatively small amounts of Sodium Sulfide, which makes it of value for the dyeing of raw stock in vacuum dyeing machines, as well as for yarns in beam and cop dyeing machines. Its easy leveling qualities make it also suitable for the dyeing of warps and piece goods.

National
Sulfur Black BG Extra Conc.

This is the greenest type of National Sulfur Blacks. It dissolves readily with half the usual amount of Sodium Sulfide Conc. It is adaptable for the dyeing of raw stock, yarns and piece goods in all types of machines.

Product samples and complete technical information of both these new types will be supplied to dyers and others interested on application to any of the "National" branches.

National Aniline & Chemical Company, Inc.

MAIN OFFICE
21 Burling Slip, New York City

Boston	113 High St.
Charlotte	236 W. First St.
Chicago	111 W. Washington St.
Hartford	209 State St.
Montreal	8 Place Youville
Philadelphia	653 N. Broad St.
Providence	28 N. Main St.
San Francisco	120 Second St.
Toronto	14 Front St., East

THE FIRST AND LARGEST MAKERS OF COAL-TAR DYES IN AMERICA

NATIONAL DYES

COTTON

Published Monthly by

W. R. C. Smith Publishing Co., Dalton and Atlanta, Ga.

L. L. ARNOLD, Editor. R. W. PHILIP, Associate Editor.

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Orders for any change in advertising must reach Atlanta previous to the tenth of the month preceding month of issue, otherwise publishers cannot be responsible for changes.

When changing address, notify us, not the postmaster. Always give the old address as well as the new one.

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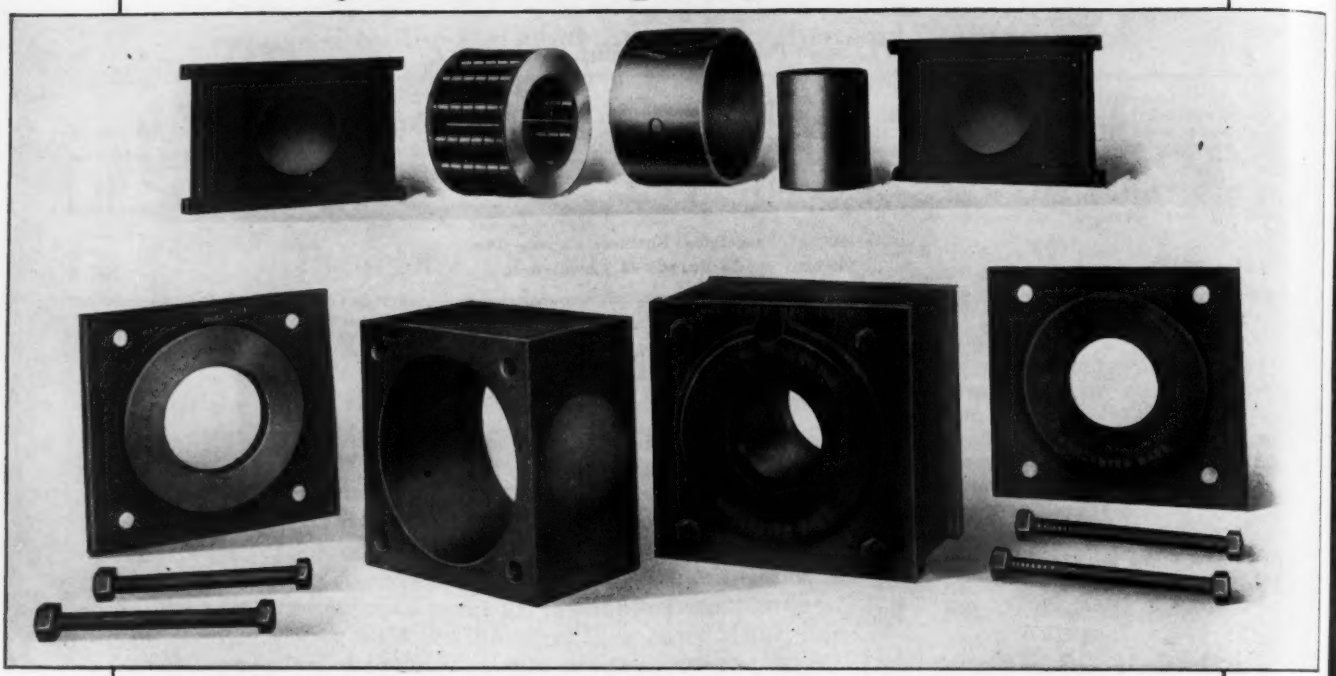
Rejuvenate Your Finishing Machinery Use Hyatt Bearing Replacement Boxes



These and similar Hyatt bearing replacement boxes have been recently installed on 12 Washers and 12 Squeezers at a large finishing plant in Rhode Island. They will eliminate oil troubles, save 25 to 30% power, and being durable will give truly dependable service. Boxes made by the G. & N. Machine Company, Worcester, Mass.

To secure the many advantages of Hyatt roller bearings on washers, squeezers and calendering machines it is not necessary to wait until you order new equipment.

These Hyatt bearing replacement boxes are designed especially for finishing machinery and are an easy, economical method of adding years of useful service to the life of your present equipment.

Lubrication troubles are eliminated by the use of Hyatt bearings because the drip proof boxes prevent oil being thrown onto goods and also keep water out of the bearings. The bearings need only be lubricated with heavy oil or light grease three to four times a year.

A prominent manufacturer of washers finds that Hyatt bearings save from 25 to 30% of the power required when ordinary bearings with their rubbing friction are used.

These advantages can be secured throughout the life of the machinery without bearing replacement because Hyatt bearings are durable and operate for years with no appreciable wear.

Can you longer afford to operate ordinary bearing finishing machinery? Rejuvenate it by the use of Hyatt bearing replacement boxes—it pays.

Hyatt Roller Bearing Co., Industrial Bearings Division **New York, N. Y.**

Motor Bearings Division, Detroit
Tractor Bearings Division, Chicago

USE HYATT BEARINGS ON YOUR LINE SHAFTS TOO BULLETIN 125

Pacific Coast Division
San Francisco

With the Publishers—

What the Banker Thinks of Advertising.

Guy Emerson, Vice-President of the National Bank of Commerce in New York, discusses this subject in the February number of *Commerce Monthly* and some of his conclusions are of especial interest to business men. Among other things he says:

"It is becoming more and more common for bankers to regard a radical cutting down of an advertising expenditure with close attention. The sharp reduction in the advertising of nationally distributed articles, the reputations of which were apparently so firmly established that nothing could affect them adversely, has been followed so regularly by a heavy falling off in sales, that the need for caution in such cases is widely recognized. The banker is coming to realize that public interest is not necessarily a permanent possession. It can be won only by skillful competition in a world where every device is mobilized to win the notice and stimulate the action of the average man or woman, from the hour of rising in the morning till the hour of retiring at night. The morning mail is full of circulars; selling appeal fills the newspapers and magazines, the bill-boards, the street cars and shop windows as one goes to work and returns in the evening. To win a place in the crowded and beseiged mind of the modern man is not equivalent to holding such a place. It is more like creating a melody which the prospect hears, enjoys and inevitably forgets. It must be played and re-played, or other melodies will take its place. Not even the greatest corporation or the most popular product can hope to build up a reputation which will of its own force endure. The history of advertising is filled with striking proofs of human forgetfulness.

"If a further instance is needed of the progress of the banker's belief in advertising, it is to be found in the great volume of advertising placed by bankers purely for purposes of developing good will. Banks have been among the pioneers in this field. Many large banks, having nothing tangible for sale, find it advisable to advertise extensively. The aim is not to secure direct returns. The object in view is to develop the highest type of national good will for an institution doing a country-wide but at the same time a highly specialized business. To understand the value of advertising which produces demonstrable and early returns in dollars and cents is simple enough. But when bankers are willing to spend substantial sums year after year for advertising to build their standing, and to keep their good name continuously before the forgetful public, it indicates a receptive attitude, at least toward this particular branch of advertising.

"Unquestionably, advertising has an important future. Many business men believe that the ultimate tendency of modern salesmanship is toward operations on a large scale, that the great sales successes of the future will be based upon volume and wide distribution. If this is true, the test of success will be an honest product, manufactured with the highest efficiency and economy and marketed widely on a small margin of profit. Advertising will be a powerful factor in this development. Such distribution cannot be lastingly built by spectacular advertising methods. To be successful, the advertising must be laid out with as much vision, must be as carefully planned, and as economically executed as all other parts of a selling campaign.

"The forward looking banker will be glad to see the advertising specialist take his proper place in the world of sounder business which we hope will replace the more slashing and wasteful periods of the past. But the banker's attitude, while important will not be the controlling influence in advertising progress. The predominant relationship will always be that of the advertising man to the business executive. And, more fundamental still, the business of advertising will not progress or decline because business men or bankers, or any other group, prefer to smile or frown upon it. Its prosperity or the reverse will depend first, upon the basic profit-producing importance of advertising as determined by the inexorable operation of economic laws; and second, upon the downright human ability and integrity with which advertising men build upon the basic opportunity which is presented to them."

The Man Who Pays.

The will to pay is hereditary, just as much as red hair or buck teeth. It is a common fallacy that a man pays his debts because he has money. This is not necessarily true. On the contrary, the matter of paying has only a remote relation to money.

On the one hand is your friend with abundance of money, who cannot be cajoled, threatened, beaten or gassed into paying the most ordinary debt.

On the other hand, the poor fellow without a visible dollar—you know him—who is Johnny on the Invoice. Money has little to do with either case. It is the breed of man.

The man who pays is the man who thinks in advance. He never flashes a roll; he does not drive a car and carry a mortgage at the same time; he does not hang up the butcher, or the grocer, for food that he cannot afford to eat; he never lights the fire without wondering where the coal man gets off. He never throws the Bull, nor pitches the Bluff, nor gives notes, nor writes checks dated tomorrow, but when the bills come in, he is there with the coin of the realm. God bless him.

Sometimes he feels sore at the rest of us. He does not see that he gets on any better than the fellow who skins as he goes. Still he goes on and on, pays and pays, simply because it is in the breed.

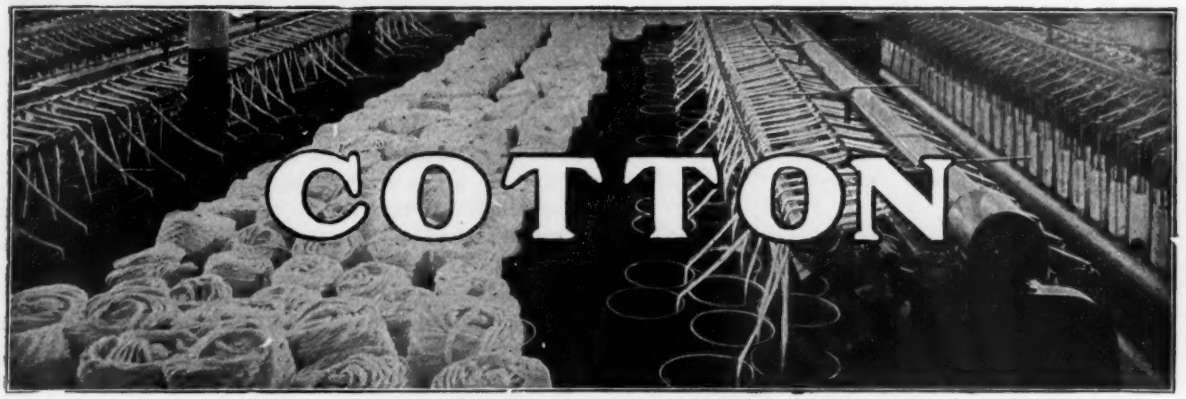
And after all, the World does think a lot of his breed. The man who pays is the bulwark of Society. He is the balance wheel of civilization. He is the mainspring of commerce. Business blesses him and he has honor among men for all time.—*W. H. MacKellar, in the Roycroft Magazine.*

AMONG COTTON'S READERS

Joseph J. Bradley, Agent
Merrimack Manufacturing Company,
Huntsville Mill, Huntsville, Ala.

"In this day and time we are all striving to make our dollars purchase full value. My opinion of COTTON is that when one signs up for a subscription to COTTON he is getting value and then some in reading concerning the textile trade."

Joseph J Bradley



March, Nineteen-Twenty-Two

At The End of a Year.

The nation has had a year of President Harding, and President Harding has had one year of the Presidency. It has been a full year. Next November the country will have an opportunity, in the Congressional election, to register what it thinks of President Harding. The election of a Republican majority in both Houses of Congress will mean a verdict of approval. The loss by the Republicans of either House will be a verdict of censure.

President Harding has taken no one into his confidence concerning just what he thinks of his year of presidential life, except to admit that it has been a busy one. For being the President of a nation of 110,000,000 people amidst the international chaos that has followed the World War, is anything but a Sunday school picnic. It did not take President Harding long to find that out and so far he has found nothing to make his job an easier one.

If it were possible to get a picture of the inside of President Harding's mind, it is likely that we would learn that he looks upon Congress as the hardest problem he has to face. Congress has had a difficult time of it since the 1920 landslide piled up an overwhelming Republican majority in both Houses. The very size of the majority has made its work difficult. The Republican leaders in both branches of Congress have found it just about as hard to hold the Republicans in line as to outvote the Democrats. The Agricultural bloc, which has upset so many Republican calculations, has been only one item in this list of difficulties. Every week or so the leaders in the two Houses have come to the White House in the hope that they would find either encouragement or decision there. But President Harding has been a stickler for the independence of Congress and he has leaned backward in avoiding opportunities to tell the Congress what to do. Not that he has been niggardly about recommendations. He has asked Congress to transact a lot of business; he has recommended long schedules of important legislation. But in all his recommendations, the President has been careful not to become too specific; not to itemize with too much detail just what and how and when he wanted all this done.

Throughout the long fights over the tariff and bonus, the Congressional leaders have beset the White House for definite guidance which they might translate to their following as "orders from the White House." President Harding has sidestepped all these temptations. He has counselled with legislative leaders; he has invited them to elaborate dinners; he has encouraged them to tell him what they think and why; but he has been careful not to give them directions. The result has been that a lot of White House dinners were wasted. Merely to bring Senatorial and Congressional leaders to the Executive Mansion, for discussion, has rarely resulted in anything tangible enough to show up on a roll call. Much of this discussion has also been carried on chiefly to sound out public opinion. Every time some one at the Capitol, the Treasury Department or the White House made a suggestion for a tax that could supply the bonus deficit the President and the Congressional leaders listened anxiously for a response from the public. If that response were negative, the suggestion slipped noiselessly into a wastebasket. In the bonus fight the great difficulty lay in the fact that while the bonus itself was popular, especially with the politicians, none of the various taxes that were proposed for its payment aroused any popular response. There were times when the bonus bill's sponsors almost despaired of being able to keep that bill on the profit side of the political ledger. From the beginning, little effort was made to conceal the fact that the bonus bill was to be passed because of the demand from the "soldier vote." Some of the suggestions for additional taxes, however, threatened to involve protests from elements among the people who were even more numerous than the former service men whose vote was to be obtained by means of the bill.

The gasoline tax, for instance, threatened to arouse the opposition of the millions of farmers and automobile owners in the country to a point that would more than offset any possible vote to be won by the bonus itself.

While the Congress was thus talking about a bonus and trying to find money enough to float it, it also undertook a general drive in economy on governmental expenditures. The budget machinery has functioned with fair smoothness and important savings have been registered. There has, however, been a temptation each time to spend the savings on some other and possibly more popular form of governmental amusement. Whether the budget will finally result in saving as many millions as its sponsors promised a year ago is a question that only the treasury will be able to answer after the returns are all in. Congress still has a lot of appropriation bills to pass and the departments are full of suggestions for spending the money which the budget has saved.

The threat of a coal strike has also helped to add to the domestic worries of the White House. Through the efforts of Secretary Hoover, President Harding began last year to frame a governmental program that might prevent this Spring's coal strike. It made little headway and subsequent efforts promised little better. The most sanguine expectations seemed to be that it would be possible to prevent the railroad workers from joining the coal miners in their walk-out.

If domestic worries have been sufficient to keep the President awake nights, international difficulties have also added their share. The Arms Conference spent twelve weeks in hard labor and produced a grist of treaties which President Harding laid before the Senate. The President and his advisers were highly enthusiastic about the results of the conference and saw in it great possibilities for future friendly agreements among nations. It will be necessary, however, to await the final action of the Senate on the various treaties to determine just how much of an asset the Arms Conference will prove in the November election.

But even the Arms Conference was only a part of the international troubles of the nation. Europe has made little progress toward stabilization. Instead, there have been many signs that the situation in Europe has been growing worse. There have been times when it looked as though the American administration might be willing to help in an international undertaking to raise exchange values of depreciated currencies and to devote a couple of billions of American dollars to the job of floating Europe back to the dock of prosperity. The popular resentment against any plan to cancel the European debts has prevented anything that looked like a real remedy. President Harding would like to use the resources of the United States in an effort to help Europe to its feet, chiefly in the belief that rehabilitated Europe would mean prosperity for American industry and commerce. At no time, however, has he been able to convince his advisers that a real cure of European ills is possible under present conditions. The Genoa conference might have taken a step in that direction, but its success was predicated, from the beginning, upon real harmony among the European participants. The bitter hostility between the French and British governments, however, spoiled this plan.

The second year, now just started, has all of these "hangover" problems for the President and Congress to solve. In addition to these, there will be presented a number of farmers' aid financing schemes in which the agricultural bloc is interested; and the permanent immigration legislation in which every American citizen is interested.

Sherlock Holmes in the Mill.

An Old Timer says that all men like detective stories. Believing this to be true we are printing two in this number; one by an Old Timer who says he doesn't know how to write one and the second by another superintendent who first records his mystery and then gives the details of its solving. However, like many mysterious things, the solution still leaves a hazy middle ground for further exploration and this particular Sherlock is anxious for other mill detectives to deduce answers to a list of questions he has propounded concerning static electricity.

When you think about it, there are a lot of mysterious things happen in the mill and finishing plant. In fact, a very considerable part of the time of the superintendent or some of his department heads is devoted to finding and following "clues" in an effort to solve some particular mystery. Sometimes it is something spectacular as in this static electricity case and again it is just a baffling weakness in the breaking strength such as that indicated by "E. H." in the January number. Whatever is wrong must be found and corrected before the mill is on its proper basis.

The reading of detective stories seems to be a good mental exercise, for while the sleuths of the stories use thumb and finger prints to catch the criminal, the sleuths in the mill have evolved a system for charting his movements in certain instances. This system is somewhat elaborated upon in the article by James Robertson in this number and the criminal he caught in this instance was new crop cotton, but with the aid of his chart he was able to trace this disturber of the peace through each department and absolutely satisfy himself that the cotton was the cause of the trouble.

Innumerable instances might be cited where elaborate investigational work was necessary to solve some apparently simple mill problem. Furthermore, the work of the mill detective does not stop with finding the trouble, it is then up to him to devise some burglar proof device to prevent the return of this particular type of marauder, or to sound an alarm at his approach.

Therefore the reason mill men like detective stories is at once evident—such mental efforts are a part of the daily work to which they are accustomed and their minds are trained to resolve certain effects into small factors, one or more of which may be isolated and tagged as being the probable cause.

Hoover on The Railroad Situation.

Just at the present moment, when congressional leaders are so wrought up over rendering aid to the needy through the medium of a soldiers' bonus to be raised by increased taxes, and the further appropriation of huge sums to aid the farmers in their distress, it is a relief to the harassed business man to read the clear cut suggestions of Herbert Hoover, Secretary of Commerce, in a statement recently made before the Interstate Commerce Commission. After outlining the situation in a few introductory words, he points out that our problem is to expedite the recovery of the country from the business depression caused by economic readjustments—to speed up employment of our workers, and thereby find a market for the products of our farmers.

"If we look at the national economic situation as a whole," continues Mr. Hoover, "the greatest impulse that can be given to recovery from any source whatever is a reduction of rates on primary commodities combined with the immediate resumption of railway construction and equipment. The first depends upon reduction of operating costs, the second upon restoration of credit for our railways.

"One thing is absolute. Our transportation facilities are below the needs of our country, and unless we have a quick resumption of construction, the whole community—agricultural, commercial, and industrial—will be gasping

from a strangulation caused by insufficient transportation the moment that our business activities resume. For the past five years, we have had no consequential expansion to our railway transportation machine. With but one interval of 9 months in 1918 and 1919 we had a car shortage throughout the whole of the years 1916-17-18-19 and 20. This shortage rose to as high as 160,000 cars with a corresponding shortage of motive power. We paid tremendous sums in commercial losses and unemployment in consequence. We laid it onto the war. We should lay it onto our lack of foresight and our antagonism to railroads.

"Few people seem to realize the amount of expansion in our transportation machine necessary to keep pace with the growth of the country. And an equally few seem to have any notion of the price we pay for not having it. Our country is more dependent upon railway transport than any other. All others have comparatively greater coast lines and internal waterways. The experience of the twenty years before the war has shown that we must build an extension of lines, including terminal facilities, additional sidings, etc., every year equal to the construction of a new railway from New York to San Francisco. We must add at least 120,000 cars and 2,500 locomotives annually to our equipment. Since we entered the war in 1917 we have constructed at least 10,000 miles of railways less than our increasing population and economic development called for and we are behind in rolling stock by about 4,000 locomotives and 200,000 cars. I wish to emphasize that unless we can have an immediate resumption of construction and equipment, our commercial community will pay treble the cost of the whole of them in their losses of a single season. The very moment that we reach anything like normal business we shall see a repetition of car shortages, followed by an increase in the cost of coal to the consumer from one to three dollars a ton; we shall again see premiums of 20 cents a bushel for the use of cars for moving grain; we shall in fact see a shortage of commodities to the consumer; and we shall see gluts upon the hands of the producers. We shall see factories filled with orders again closed for lack of cars; we shall see large intermittency in employment; and we shall see the usual profiteering in commodities due to a stricture between the producer and consumer.

"There would be no difficulty whatever, by basing such losses on the experiences we have already had, to calculate a loss to the American people of a billion dollars for each one of these periodic transportation shortages.

"Furthermore, there is nothing that is so irrecoverable a loss to the nation as idle shops and idle men. Today we have both. There is nothing that will so quickly start the springs of business and employment as an immediate resumption of construction and equipment of the railways. When business does resume, we shall need all of our capacity for the production of consumable goods. We shall not only find it strangled for lack of transportation, but we shall find ourselves plunging into the manufacture of this very railway equipment and construction in competition with consumable goods for materials and labor. Herein lies the basic cause of destructive price inflation and booms, with all their waste and over-expansion. In times of depression, we should prepare for the future and by doing so we can cure the depression itself.

"If we examine the fundamental reasons for failure to resume equipment, we will find them in the loss of confidence in railways as an investment and the competition of tax free securities. We have passed the period of credit strain in this depression. Surplus capital is pouring by hundreds of millions monthly into tax free securities and foreign loans, and yet our railways are unable to finance the most moderate of construction programs. The confidence of the public in railway investments was at so low an ebb before the war that finance by the issue of common and preferred stocks had become impossible and railway expansion was living on bond issues. The confidence of an assurance and continuity in earning power to cover this burden of bonds has been even lowered since the war began, because of the uncertainties of both rising and falling prices, of rising and falling wages, of rising and falling rates preventing all regularity of earnings upon which an investor could be convinced, even if no other difficult factors entered into the problem. I see no occasion to go into the labyrinth of past railway finance, its propriety, or lack of propriety, its foolishness or its skill. That generation is gone by. This Commission approaches the financial problems of the railways upon the actual value, not upon their issues of securities and I take it we are living for the future, not the past. We want transportation, and we want it with the values of private initiative and clean public service.

"If we look to the immediate future with its complete necessity of paring the railway earnings down to little more than bond interest, until we give relief to the shipper (and thus the primary foundation to business recovery) I can see little likelihood of convincing the investor as to his margins of safety. There is an atmosphere that our railways will never again earn profits, and that they are not as an industry worthy of investment, and that because private investors will not come to their assistance nobody can do anything.

"Far from it being impossible for our railways again to return to a profitable footing, I believe it is possible to demonstrate that on an average they will become very profitable. If we assume that the reduction of prices and wage levels will settle at a plane no lower than 50 per cent over pre-war, and if we assume that the present rates are to maintain, and if we assume restored traffic, then the earnings of our railways would exceed 15 per cent on the whole of the Commission's tentative valuation. Surely there is room here for safety to investment, as well as relief to the shipper.

"But the circumstances being as they are, confidence being at a low ebb, we do not have the equipment necessary for our business. We are driving headlong for a setback to our whole commerce the very moment that we begin to get on our feet.

"In these circumstances it seems to me vital that the railways as our greatest industry should propose a courageous program of broad visioned betterments and if necessary the Government should consider giving the use of its superior credit. It would not cost the taxpayer a cent to give the Government guarantee to equipment trusts upon the primary responsibility of the railways the proceeds devoted entirely to improvement and equipment. This is no proposal to take money from the taxpayer. It is a proposal to save him from paying treble the amount of his

(*Continued on page* 316.)

Yarn Charting

BY JAMES ROBERTSON.

All human beings like pictures. The phenomenal success of the moving picture industry has convinced American business men that the most effective appeal to the public may be presented in the form of pictures.

Engineers have for many years recognized this trick of human psychology and used pictures or graphic charts to convey engineering facts. These graphs are merely pictures of figures presented in such a manner as to show their relationship and connection. A simple chart may convey more information than the most elaborate written report because it eliminates detail and makes the important points stand out in a manner that cannot be overlooked.

Because of these very evident facts the value of using charts in cotton manufacturing cannot be overestimated. It allows the busy executive to glimpse the general results of several groups of figures at a glance and it also allows the analytical mind of the superintendent or textile engineer to grasp the causes and effects of the daily happenings in the mill. In order to illustrate this fact an actual set of conditions from a mill is outlined in the accompanying chart.

This article describes the condensed yarn chart shown on the following page, which, if studied carefully and thoroughly, reveals much information to the superintendent as to the daily changes in the running of his work, covering variations in yarn numbers, breaking strength, beam weights and cloth weights. The variation in the numbers of the yarn soon show up in beams and cloth. The breaking strength and its relations, etc., can be readily seen and will be discussed further on in this article.

This chart is made up of heavy manila drawing paper and mounted on a board frame to be readily examined at any time. The chart is divided into three sections. The frame proper measures about 30 inches by 40 inches, and is ruled sufficiently to cover a period of four months. Only a section of one month is given in the accompanying illustration to give in essence what information may be derived from this chart.

The warp chart shows the yarn number in double line. The breaking strength is shown in dotted line. The roving from which this yarn was made is shown in the single solid line. At a glance the yarn size, the roving size and the breaking strength can be seen—their relation to one another is readily evident.

An examination of the chart illustrated here shows us that there was quite an appreciable drop in the breaking strength of the yarn between November 22nd and November 25th. Also that there was no great change in the yarn number or roving size during that period. There occurs right away the question, "What caused the drop in breaking strength?"

At this mill, a week before these dates, the cotton run had come from the new year's crop. This new cotton when followed up in the spinning room and weave shed, showed a loss in percentage of production. Our yarn and our roving was o k, and showed little variation. There was then the new cotton crop to blame for this drop in the chart.

We notice further that after this drop in the breaking strength, the yarn varies more widely in numbers and breaking strengths. This shows the irregularities which may be read on the chart caused by the new crop of cotton going through.

When we view the warper beam record we see that when the roving got heavier beginning November 23, it was about December 3rd or 4th before it showed up on the beams, and again it may be a matter of several weeks before it shows in the cloth weights.

The filling chart shows a record for the new cotton crop that is identical with that shown on the warp yarn chart, but we notice that the filling was considerably lighter from December 5th to December 10th. This readily shows up in the cloth weight on December 13th to 16th.

Innumerable comparisons can be made from a chart of this kind when we know just what caused the changes, or it may be an easy means of finding what was the cause, and also the remedy therefor. Anyway, it certainly visualizes every movement of the stock in process throughout the mill —what the changes are and in what process the changes first showed, together with how long it might take them to show up in another particular process.

In almost every mill we plot production charts. That is the cry—more production means lower costs, which is the paramount issue today. But listen, we all know and have heard "Make good yarn and you will have good weaving." This may be readily aided by charting and visualizing exactly what occurs from day to day in the various departments.

Alterations can be made in this chart to suit any mill or a series of numbers of yarn being made. All in all, it will repay many times the effort and time expended in keeping up this work. Everything from the cotton to the weather is quickly seen affecting the yarn to the cloth. It is hoped that other mills will follow this practice and that much benefit will be derived from the effort spent. Also we readers of COTTON would like to know what others are doing in this line and what success they are securing.

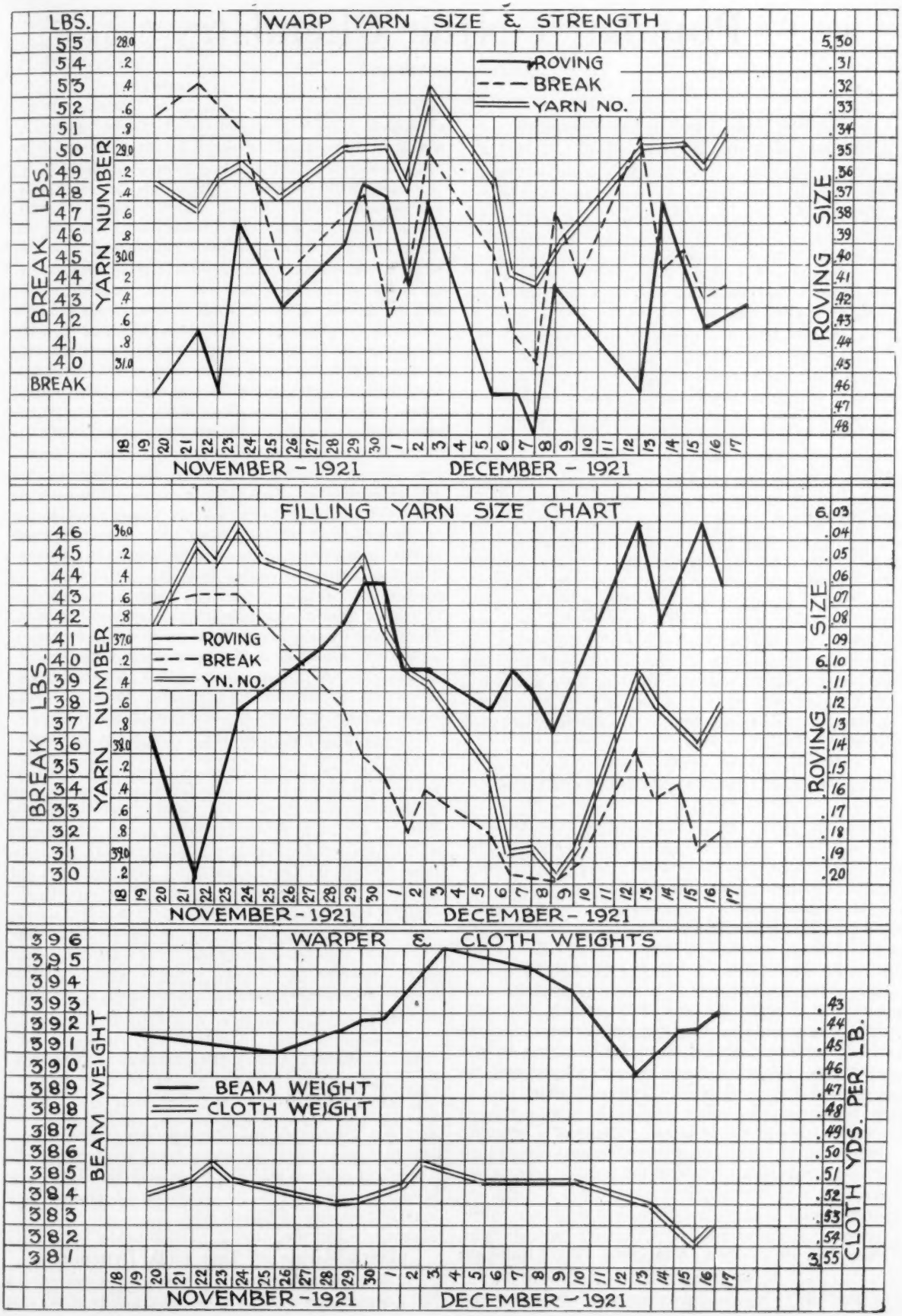
Popular Textile Chemistry.

(*Continued from page* 313.)

The carbon dioxide gas is compressed into cylinders and sold to manufacturers of carbonated beverages, while the magnesium sulphate is allowed to crystallize in water to form the needle like crystals called "Epsom Salt." Besides its use in the dyehouse, Epsom salt is used in the manufacture of leather for adding weight and plumping the hide. Part of the Epsom salt is recrystallized and sold as U.S.P. The expression U.S.P. means that it complies with the purity tests as outlined by the United States Pharmacopoeia, and the goods can be sold for medicinal purposes.

The next article will be on Chloride of Lime and chlorine bleaching compounds.

The Merrow Machine Company, Hartford, Conn., manufacturers of overedging, overseaming and shell stitch machines for finishing all kinds of knitted and woven fabrics, distributed a useful calendar for 1922.


WARP YARN SIZE & STRENGTH
LBS.
BREAK LBS.
YARN NUMBER
ROVING SIZE
ROVING
BREAK
YARN NO.
NOVEMBER - 1921
DECEMBER - 1921
FILLING YARN SIZE CHART
BREAK LBS.
YARN NUMBER
ROVING SIZE
ROVING
BREAK
YN. NO.
NOVEMBER - 1921
DECEMBER - 1921
WARPER & CLOTH WEIGHTS
BEAM WEIGHT
CLOTH YDS. PER LB.
BEAM WEIGHT
CLOTH WEIGHT
NOVEMBER - 1921
DECEMBER - 1921

Popular Textile Chemistry

BY JAMES A. BRANEGAN,

PRESIDENT, KALI MANUFACTURING CO., PHILADELPHIA.

Metallic Salts Used in the Dyehouse.

Sulphate of Iron, Copperas, ($FeSO_4$. 7 H_2O).

Iron in the form of sulphate is much used in the dyehouse and the lower form is sold as copperas, while the higher oxidized form is known as nitrate of iron. Both these names are misleading as the former salt (copperas) has no connection with copper, while the latter (nitrate of iron) contains no more than a trace of nitric acid. The correct name for copperas is *Ferrous Sulphate* meaning a sulphate of iron in which the iron exists in the ferrous or lower oxidized form and its molecular formula is $FeSO_4$. Fe stands for iron (ferrum), S for sulphur and O for oxygen. As there are no figures after the Fe and S it signifies one atom, therefore, the complete molecule of Ferrus Sulphate (copperas) consists of one atom of iron (Fe), one of sulphur (S) and four of oxygen. Also in commercial copperas there are seven molecules of water (Water contains two parts of hydrogen and one part of oxygen and is written H_2O) and the chemical formula for the green crystal salt used in the dyehouse is $FeSO_4.7\ H_2O$. By weight the proportions are much different. All elements have a certain atomic weight based on hydrogen which is considered the unit or one, thus if an element has an atomic weight of 50—it is fifty times as heavy as hydrogen. The atomic weights of all the elements have been carefully determined by analysis. An *atom* is the smallest particle of an element while a collection of atoms forming a compound is called a *molecule*. Knowing the atomic weight of all the elements we will proceed to figure out the proportions of the various elements in commercial copperas ($FeSO_4$. 7 H_2O).

Element	Atomic weight	Total	Per cent
Fe	56	56	20.5%
S	32	32	11.5%
O_4	16 × 4	64	23. %
$(H_2O)_7$	18 × 7	126	45. %

Total molecular weight = 278

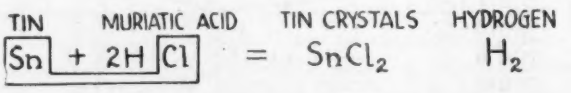
In figuring water it is customary to use the complete molecule H_2O, weight 18 instead of multiplying hydrogen by 14 (atomic weight of hydrogen = 1 × 2 × 7 = 14) or oxygen by 7 (atomic weight of oxygen = 16 × 7 = 112). From the foregoing it is plain that copperas contains 45% of water and only 20.5% of iron. Formerly copperas was made by dissolving rusty iron in sulphuric acid diluted with water and allowing the copperas to crystallize out. Of recent years, however, all the copperas is obtained from steel mills. These mills clean (pickle) the rusty iron rods, before drawing, by placing them in a weak solution of sulphuric acid. The result is that after the solution is worked out the solution contains sulphate of iron (copperas). Formerly this solution was thrown away, but now, however, it is concentrated and the copperas allowed to crystallize and sold to the former manufacturers. It is used principally in dyeing logwood blacks.

False Nitrate of Iron (Red Iron) Ferric Sulphate ($Fe_2(SO_4)_3$).

This salt of iron is erroneously called *Nitrate* of iron, although it contains no nitric acid whatsoever. It is used mostly in dyeing black on silk and thirty or forty years ago *true* nitrate of iron (made from iron and nitric acid) was used for this purpose. True nitrate, however, is expensive and it was discovered that by oxidizing ferrous sulphate to ferric sulphate the same results could be obtained and at a lower price. For a number of years this ferric sulphate was known as *false* nitrate of iron, but in the last fifteen or twenty years the false has been dropped and it is known simply as nitrate of iron, or red iron, the last name being sometimes applied on account of its color. In this article on iron salts I have mentioned both the Ferrous and Ferric Iron and this needs some explanation. Iron forms two distinct oxides with oxygen, the first or lower oxide being in proportions of one atom of iron (Fe) and one atom of oxygen (O) and we write this as FeO or Ferrous Oxide. All salts made from this oxide are ferrous salts. By oxidizing ferrous oxides or other ferrous salts we add one atom of oxygen to every two atoms of iron and the proportion is then 1½ oxygen atoms to one atom of iron. In order to avoid the fraction we write this higher oxide as Fe_2O_3 meaning two atoms of iron to three of oxygen or 1 to 1½. All salts formed from this higher oxide are Ferric Salts. Copperas, therefore, $FeSO_4$ is Ferrous Sulphate and "Red Iron" is $Fe_2(SO_4)_3$ or Ferric Sulphate. This change from lower iron salts (-ous) to higher (-ic) is usually brought about by heating with an oxidizing agent, such as nitric acid, permanganate of potash or bichromate of potash. Ferric sulphate (Copperas Nitrate of Iron) is used extensively in dyeing logwood blacks on silk.

Stannous Chloride (Tin Crystals) $SnCl_2$

This salt was formerly used to considerable extent in the dyehouse, it is now used only for special purposes, such as stripping or reducing. The technical name for tin is Stannum and its symbol is "Sn," the symbol for Chloride is "Cl" and for Hydrochloric (Muriatic Acid) the molecular formula is "HCl" meaning one part hydrogen and one part chloride. In the manufacture of tin crystals, metallic tin is melted and poured into water in order to granulate it. This granulated tin is then dissolved in hydrochloric acid with the evolution of hydrogen and the formation of stannous chloride (tin crystals) which crystallize from the liquor upon standing. The reaction is expressed as follows:



Note that it takes two complete molecules of hydrochloric acid to combine with one atom of tin, which forms one molecule of stannous chloride. Tin crystals are slightly yellowish in color and in the formation of needles, very similar to crystals of Epsom salts.

Stannic Chloride, $SnCl_4$ (Bichloride of Tin) (Tetrachloride of Tin) (Silk Dynamite).

In the paragraph on iron salts it was shown the iron has the power of combining with not only 1 part of an acid

radical but also with 1½ parts of an acid radical, and tin also has this quality but differs from iron in the proportions in which it combines. With chlorine tin forms two salts Stannous Chloride ($SnCl_2$) mentioned in the previous paragraph and Stannic Chloride ($SnCl_4$) or tetrachloride of tin, the former being one atom of tin combined with two atoms of chlorine and the latter with four atoms of chlorine. This raising of the *Valence* (combining power) of tin can be brought about by oxidation with nitric acid, a reaction similar to that of iron and this method of manufacture was formerly followed. Of recent years, however, it was found that when dry chlorine gas was passed over heated tin, the tin passed at once to the stannic or higher oxide form and combined with the chlorine to form at once Stannic Chloride ($SnCl_4$). Mostly scrap tin plate is used such as roundings from stamping mills and can factories. When the dry chlorine gas is passed over the heated tin the $SnCl_4$ forms as a vapor and is condensed to a liquid and shipped in drums. What is left behind in the retorts is high grade scrap sheet steel. Stannic Chloride ($SnCl_4$—Tetrachloride of Tin) in a heavy liquid which fumes in the air. These fumes are deadly poison and the liquid must be handled with care. The usual method is to attach a syphon with a pump and deliver the liquid beneath the surface of water which already contains some stannic chloride. If water without the addition of a small quantity of stannic chloride is used, great heat is generated and some of the stannic chloride is lost in the fumes while the balance forms a solid mass in combination with the water. The mass or hydrated stannic chloride is very difficult to dissolve. Large quantities of stannic chloride after dissolving in water are used for adding weight to silk. After the silk is boiled off (stripped of its gum by boiling in oil or soap) it is saturated with stannic chloride and placed in a bath of phosphate of soda. By this process phosphate of tin is precipitated on the fiber, and there is a gain of about four ounces. The process is repeated three or four times until the desired weight is obtained.

Sulphate of Copper, $Cu\,SO_4.\,5\,H_2O$ (Bluestone) (Blue Vitriol).

This salt is used in the dyehouse in conjunction with logwood or other wood extracts and mostly for dyeing black. It is also used in making up the bath for oxidized black with aniline oil. Like most metallic salts it is made by first granulating the copper and then dissolving in sulphuric acid. It crystallizes from this solution in beautiful blue crystals. Each molecule of copper sulphate in the crystalline form contains five atoms of water so that its formula is $CuSO_4.5\,H_2O$. Cuprum is the technical name for copper and its symbol is Cu, and each molecule of the crystalline form contains one atom of copper, one atom of sulphur, four of oxygen and five complete molecules of water. The blue color of the crystals is due to the water of crystallization as the copper sulphate itself is a white powder. This can easily be proven by placing a crystal of copper sulphate on a hot plate. It will first melt, then dry and crumble to a white powder. This property of turning blue in the presence of water makes copper sulphate a good testing material for absolute alcohol. If it is suspected the alcohol contains water simply add a small quantity of the dry (white) powdered copper sulphate. If water is present the alcohol will turn blue. If the alcohol remains colorless it is absolute 100% alcohol.

Bichromate of Soda ($Na_2Cr_2O_7 2\,H_2O$).

The principal chrome salt used in the dyehouse is *Bichromate of Soda* and its molecular formula is $Na_2Cr_2O_7$ meaning two parts Natrium (technical name for soda, symbol Na) two parts Chromium (symbol Cr) and seven parts Oxygen (symbol O). In the manufacture of bichromates, chrome iron ore (chromite) is powdered and mixed with lime and soda ash. This mixture is heated in a reverberatory furnace supplied with a strong current of air. When the operation is complete the mass consists of *Sodium Chromate* and insoluble carbonate of lime. The sodium chromate is dissolved out with water, filtered off and treated with sulphuric acid which converts the sodium chromate into sodium bichromate. Bichromates have extensive use as an oxidizing agenf in dyeing aniline black and they are also used as a mordant in dyeing chrome colors. Aside from the dyeing industry the makers of chrome tanned leather use enormous quantities of bichromate, and considerable quantities are used in electrical work.

Chrome Alum ($Cr_2(SO_4)_3(NH_4)_2SO_4\,24\,H_2O$).

This is a double salt of Chromium Sulphate $Cr_2\,(SO_4)_3$ Ammonium Sulphate $(NH_4)_2SO_4$ and 24 molecules of water (24 H_2O). These sulphates are made in the usual manner as outlined under iron in other words sulphuric acid is combined with ammonia and chrome and the solution allowed to crystallize. Chrome alum at one time was much used as a mordant but its consumption has gradually lessened and today there are few calls for it.

Aluminum Acetate $Al_2(C_2H_3C_2)_3$.

This salt is used much by dyers of oxidized black and put in the first bath with the aniline salt and chlorates and by its use a stronger fiber is developed. It is also used in the waterproofing of fabrics, one bath being sufficient to make the goods water repellent. As its name indicates *Alumium Acetate* is a compound of aluminum and acetic acid.

Magnesium Sulphate, (Epsom Salts) ($MgSO_4\,7\,H_2O$).

This salt is gradually coming into use, especially in the finishing of sulphur blacks on hosiery. The ore from which Epsom salt is made is called *Magnesite,* a natural carbonate of magnesia. This ore was formerly brought from Greece, but in recent years large deposits have been uncovered in California. The manufacture, which also includes the manufacture of carbonic acid gas (CO_2) is as follows: The ore magnesite is *Carbonate of Magnesium* and its formula is $MgCO_3$, meaning one atom magnesium, one atom carbon and three atoms oxygen, while sulphuric acid (H_2SO_4) is two atoms of hydrogen, one atom of sulphur and four atoms of oxygen. Now when carbonate of magnesia and sulphuric acid are brought together they combine at once with the evolution of carbonic acid gas (CO_2 Carbon Dioxide) and the formation of water. The reaction is expressed as follows:

Carbonate of Magnesia		Sulphuric Acid		Epsom Salt (Sulphate of Mag.)		Carbonic Acid
$MgCO_3$	+	H_2SO_4	=	$MgSO_4$	+	H_2CO_3

The latter compound carbonic acid H_2CO_3 breaks down at once into CO_2 (carbon dioxide gas) and water (H_2O), so that the reaction is usually expressed as follows:

$$MgCO_3 + H_2SO_4 = MgSO_4 + CO_2 + H_2O$$

(*Continued on page* 310.)

Suggestions on Design and Finish

BY BURTON H. ALLBEE.

The figures showing imports of fancy cotton goods in 1920 aggregating $130,000,000 indicate that the field for making these goods is not entirely occupied in the United States, yet, the demand for fancy cottons grows with the passing seasons, and retailers say it is greater today over their counters than it ever was before. They say that while the demand slowed up during the war, and for a time afterward, when readjustment was the principal point of discussion everywhere, today the demand is steadily growing and is much stronger than it was before the war disturbed commercial relations.

Before considering the growth of the trade here and its possibilities in the future it is well to remember that foreign manufacturers have made fancy cottons a specialty for a great many years. They have worked out designs which are popular wherever such cottons are used and they have overcome the difficulty of dyeing satisfactorily. Their cottons have acquired a name everywhere in the world which makes them sought for, even consumers understanding the value of some of the names of manufacturers in England and Scotland.

This reputation, which virtually insures sales, has not been acquired without long and arduous work, work which has required the utmost of endeavor in every department of production. Beginning in the laboratory and following through every process manufacturers and converters have found it profitable to continue a work begun many years ago and are still continuing it, even though they have a reputation which sells their fabrics without much difficulty. But they continue their efforts, making such improvements in colorings, design and construction as they are able to. Competition has not yet forced them to make great improvements, but they are continuing their work and expect to maintain their position in the textile manufacturing world regardless of the competition that may develop in the coming years. Unquestionably American manufacturers will compete. They are beginning to do so now, but as yet they haven't arrived at the point where they are at all dangerous.

Some American authorities say that manufacturers here depend too much upon the converter and not enough upon themselves in the preparation of designs for the lines of fancies which are offered each season. This question will have to be left to the expert to discuss. The layman does not know. But what the layman in cotton does know is that American producers are not making their lines as good as they might be, with a few notable exceptions, and trade is suffering proportionately. Where effort is exerted, both in the scientific department and in the manufacturing end, the results are always satisfactory. The American buying public doesn't refuse to respond to offers when the merchandise is satisfactory.

The results of the liberal buying during the war are not yet apparent. Whether the war increased the demand for fancies or not remains to be seen. The past season has not been a fair test. Yet, the sale of foreign goods was so large that it would seem as though consumers have turned to cottons to take the place of other fabrics, perhaps, and that they intend to buy, provided the quality and appearance of the merchandise are to their liking. Probably this latter phase of the question will have to be studied even more closely than heretofore to make one assured of his position. Manufacturers have hesitated in years past because their lines did not seem to sell as well as those from abroad and it may be that they are still hesitating somewhat. However, hesitancy at this juncture, when opportunities are more numerous than ever before, is not good policy. It is good to say that some are taking advantage of the situation and will produce lines which they think will compare favorably, with any produced anywhere.

In merchandising fancy cottons, sellers find in a general way that the colorings and designs most wanted are conservative. Few high colors, excepting for special purposes; few large or staring designs, excepting on those classes of fancies which are avowedly made for the purpose. Instead, conservatism prevails and soft tones, and small designs in subdued colorings are most wanted. Little touches of floral designs in color, conventional designs worked out in new combinations, original designs, not to large or too brilliantly colored—these are about the general trend of the situation and seem to follow from season to season with relatively little change. Fancy cottons go into the homes of the people and they are conservative in their purchases and conservative in their ideas of dressing. Consequently, the manufacturer who pleases them must conform to their tastes and produce the fabrics which they will buy from their retailers. The process is simple enough, excepting that sometimes the points of consumption and the production are so far apart that it seems impossible for the necessary information which would make manufacturing easy to pass between them.

The cotton manufacturer in making up his line of fancies needs to remember that while the wealthy buy his merchandise to some extent the bulk of the sales are to the common people. They are the liberal buyers of cottons of whatever weave and color and the same observation applies to fancies as to others. If this is borne in mind the designer can make his designs to conform with the ideas of the potential purchasers and the lines will be popular because they will appear to be in accord with the ideas of the customers. These consumers are the workers, men and women who labor on the farms, in the shops, and elsewhere. The women want the light, fancy cottons for their summer dresses and the men use a great yardage in shirts and otherwise. But they are the ones instead of the wealthy whose patronage must be sought through conforming to their taste in designs and colors. Apparently in the past manufacturers have seemed to forget this and have copied designs prepared for silks, avowedly a luxurious fabric, and these have not always appealed to the class of purchasers mentioned. It is one reason for the neglected merchandise in some of the stores.

One of the largest designers in the country said not long ago that the new designs for which cotton men are asking are very small. He showed a number which are ordered for next season and they were limited to very

small modifications of conventional designs, small floral groups or else dots, squares, oblongs, diamonds and other geometric designs in small sizes, sometimes combined, sometimes worked out alone. He said that fancy cotton manufacturers are studying their designs more carefully than ever before, speaking from his own experience, and that these results are among those which have developed from the new ideas presented by manufacturers, converters and dyers. He said, too, that converters are taking a wider interest and cited instances of where several groups of converters had been to see him and had carefully gone over long lists of designs for fancy cottons, taking some as they were, suggesting modifications for others and asking for entirely new ones in other instances.

It is quite impossible to know what the converters are doing in their own designing departments. They keep their own work very closely to themselves, but it is sufficient, perhaps, to say that they are producing more original work than ever before and the quality measures up well with the quality of fancy cotton designing anywhere. With such improvements under way, and they are but indications of what is really intended, the merchandising situation in fancy cottons seems likely to become of more importance in the future than it has been in the past.

After all, the converter or the manufacturer cannot make cottons suitable for the consumer unless he knows something of the wants and needs of his potential customers. Heretofore they have been ignored and the design selected which conformed more nearly to the idea of the wealthy person whose purchases are generally individually larger, but collectively smaller. Copying designs intended for silks, or waiting until silk manufacturers brought out their lines and then copying the designs, has had too much influence upon the situation. Happily that is passing and the design departments of cotton mills, or the purchase of designs from professional workers, are both coming to be of importance in the industry. The change began long ago, but it has not been entirely carried out by some manufacturers, and a few are still adhering to the old ways of doing things. But with the improvement now in progress, and with the understanding of the situation which manufacturers and converters are acquiring from day to day, the principal portion of the difficulty is over and hereafter steady growth in the right direction seems assured.

A well known cotton man was saying not long ago that when he was in the manufacturing end he didn't realize the necessity of originality, or of understanding the customers' needs. The thing in his mill was to produce the yardage. Their designs were taken where they could find them and selected without much regard to requirements. The thing was to get out the goods. For a time this method prevailed in cotton mills and the results were satisfactory enough. Consumers did not object particularly. They took what they could get and let it go at that, though those whose tastes were frequently offended by the ill assorted and poorly worked out or colored designs declared that when opportunity offered, if it ever did, by which they could obtain fancy cottons more suitable for their needs, they should buy them. And they did. The answer to that is the steady growth of the sale of imported fancies which has made records several years in the past and is still at such a high level.

It was said that silk could not be made in this country as good as that made abroad, but the war brought an awakening on the part of the buying public, at any rate. It was suddenly discovered that not only could silks be made in this country that equal what is made abroad, but the great mass of silks made here is better than the great mass of silks made abroad. Only in those individual designs, and the working out of the designs which characterize so much of the French and Italian output, cannot be equalled here. On the other hand, where machines are used for producing these types of silk, American manufacturers are leading foreign producers all the time and are steadily improving.

Exactly the same observations will apply to the cotton trade. The American manufacturer is not inferior to any. He can produce cloth upon the fast running American loom which is mechanically without a flaw. Not only can he do it, but he does do it daily, thousands of yards. He hasn't known in years past how to design and color his product to make it equal to that produced abroad. The white cottons produced in this country are the equal of any produced anywhere and the superior of most. But when it came to converting the gray goods into fancies the American manufacturer and converter unfortunately did not quite reach the standard required to make their work wholly successful.

It was equally unfortunate that they did not understand just what competition they must meet from foreign mills, otherwise it is certain they would have exerted themselves earlier to produce merchandise which would have attracted the favorable attention of American consumers and would have enabled them to meet the competition of the foreign producer. They were forced to face the full flood of incoming merchandise before they really understood what had happened. Getting out from under such a handicap has been a long, slow and difficult process, but they are accomplishing it and ultimately they will place upon the retail counters of America such merchandise as will meet every need of the customer here and will give to American textile development a new era in one direction.

Certain foreign ginghams have always been accepted as the standards of gingham production, but certain American ginghams produced within the year laid beside the ginghams from this famous mill showed equal quality in construction, design and coloring. It would have been quite impossible to say that they were not all produced in the same mill so far as the appearance was concerned. But the foreign cloth was a shade softer. It didn't seem to remain as stiff as the American made, though this feature doesn't make much difference to the largest users of ginghams whose requirements necessitate frequent washings, sometimes in the strongest soaps. A substantial cloth with colorings that will stand that sort of washing and will also last a reasonable length of time without fading is needed by such users and will be bought by them.

Unquestionably American producers of ginghams, regardless of who they are, can equal the output of what comes from abroad. The trade does not need to look elsewhere for either design or color. They can find it at home quite satisfactory and they are finding it at home. However, some manufacturers have still to learn that in making ginghams the proportion in a line that is given over to garish colors, to bright hues and brilliant combina-

tions should be relatively small. The subdued colorings are the ones most wanted and will be bought after the others are forgotten. Cotton takes colors so well that it is not difficult to make the shades whatever the dyer may choose, and manufacturers need to take this lesson to heart—to make the colors subdued rather than garish or in brilliant combinations.

In the fine summer goods, which are coming to be such an important part of the cotton business, the American manufacturer is holding his own with the others. Again this matter of softness of the cloth crops up, but the difference is small, and excepting for special occasions it is insufficient to prevent a sale of American made goods, even though the two were lying side by side. Yet, it is well to remember this criticism, for dress makers are prone to pass along their information and perhaps the retailer will get an opportunity to pass over a foreign piece of cloth merely because the customer wants something a trifle softer. Make the cloth, or some of it, without the characteristic stiffness which makers say is in all American cottons and the problem is solved so far as the sale over the counter goes.

This department of fancy cottons is destined to become more and more important as the seasons pass. Better cottons must be made. Improvements in construction—yes, farther back than that, improvements in the manufacture of the yarns must be made and these must be accompanied by improvements in dyeing and designing. More and more the American woman is going to want fancy cottons. Silk will always remain a queen fabric, suitable for state occasions, but not wanted for the everyday, hurly burly which is a part of most American lives. The start made is promising. The improvements now under way are indicative of still further changes to come and the situation promises in the near future to develop into a most important phase of cotton cloth manufacturing.

Unless the opportunity is seized as it opens, the situation will be rather against the American manufacturer, but with the mill man, the designer and the converter all alert, there can no longer be any reason for failing to take full advantage of a favorable opportunity developing at the very doors of American mills.

Hoover on the Railroad Situation.

(*Continued from page* 309.)

guarantee in profiteering and losses. It will render a reduction of rates earlier, for unless something is done the improvements will have to be paid over years out of increased rates. Nor would we lose a cent upon the guarantee for if American railways can not earn interest upon their borrowings let us throw up our hands and prepare for a second Russia.

"A real program of construction would in its various ramifications give relief to five or six hundred thousand of our unemployed. It would enable even added numbers to increase their standard of living, and thus give increased market to the produce of our farmers. Our farmers who look to foreign markets for their surplus should stop to consider that our home consumption of meat decreased nearly 7 pounds per capita in 1921, mostly owing to unemployment and that if this decrease could be overcome it would be worth more than a 35 per cent increase in exports.

"We talk glibly of giving billions of credits to foreign countries, to increase our farm exports. I wish to say with all responsibility for the statement, that a billion dollars spent upon American railways will give more employment to our people, more advance to our industry, more assistance to our farmers, than twice that sum expended outside the frontiers of the United States—and there will be greater security for the investor.

"Finally, I want to refer to the veritable witches cauldron being fed constantly with hates distilled from the misdeeds of railway promoters in the past, from the conflicts between the railways and the farmers, between the railways and their workmen. From all the confusion that arises from it we destroy our railways and destroy ourselves. With this Commission on one hand assuring honesty in finance, justice to the shipper and the railway investor, with the Railway Labor Board assuring justice to workers and, above all, with a great spirit of public service in our generation of railway managers, it is time to call off the witches and take some vision of our national situation if we are to pull ourselves out of this depression."

The 21st birthday celebration of the Alumni Association of the Philadelphia Textile School will be held on June 2nd, 1922, and plans are being pursued to make this gathering a most fitting occasion. John Fisler, president of the Manufacturers' Club of Philadelphia, during a recent address to the Association, stressed the importance of making this event a successful one, and the officers have already begun to plan for at least 500 guests at the outing and banquet which will be held on the date mentioned.

Among the contemplated features of the banquet, which, it is stated, will be held in the Manufacturers' Club at Philadelphia, will be the idea of assigning tables, bearing class numerals since the beginning of the school in 1884, so that each year's students may group themselves as in days past; and while no formal announcement has been made, those who have heard of this plan are enthusiastic concerning it. The officials of the Alumni Association urge a full attendance, and it is expected that many "old grads" who have not been in attendance at recent reunions will arrange their plans to be at the celebration in Philadelphia on June 2nd. Details of the affair will be given more completely from time to time.

The Newport Chemical Works, Inc., has succeeded in duplicating the old-prewar Solamine Blue F F, which was also known as Diamine Fast Blue F F B, it is announced, and is putting it on the market as Newport Direct Fast Blue S F F. This product, it is stated, was extremely fast to light, for a direct color, without being after-treated. It is said to have very good fastness to washing, rubbing, weather, hot pressing, cross dyeing, etc., as well as being unaffected by the action of weak acids and alkalies. It discharges to a pure white, and is especially used for fancy piece goods dyeing where the cotton is to be dyed and silk effects are to be left white.

Sandoz Chemical Works, Inc., announce the opening of another branch office, at Room 407, Commercial Bank Building, Charlotte, N. C.

Success is his who says little, hears much and thinks deeply.

Six Definite Things That Workers Want

5. A Square Meal

BY JAMES H. COLLINS.

They hired Tony to fire the boiler because he offered to work for low wages. But that very day the power fell off, and the engineer said it was Tony's fault—he didn't keep up steam.

They hired Tony on a basis that is common enough in business, though nobody had tried it in a boiler room before. They gave him a perfectly good boiler, and all the tools to work with, but no coal! Tony was supposed to hustle fuel himself, as part of his job, and the reason he couldn't keep up steam and deliver work to engine, shaft and pulley was that he had to spend most of his time hustling kindling wood around the factory yard.

For years they have been hiring Tony for other jobs—laborer, miner, shop hand. What he ate and where and how he ate it has been considered Tony's own personal affair—until lately. Now it is beginning to be seen that workers are not unlike power plants in that energy must be fed into them before it can be taken out, and that even the best-paid and most intelligent employees do not always know how to fire the human boiler.

Left to himself, Tony would earn his three dollars a day, save ninety cents on the dollar, and live on a loaf of bread and a couple of bananas.

Left to themselves, mechanics eat a cold lunch out of a bucket or paper bag, in the dirt and grease of the shop.

Left to themselves, girl machine operatives often hurry to work in the morning without breakfast because they are late, and if their morning's output were plotted in a curve it would show just so much energy lacking that hadn't been eaten, and therefore could not be delivered by the half-starving worker.

Many years ago an English manufacturer tried a classic experiment. He had two factories, one in England and the other in France, both making textiles by the same process. The English output per worker was just about double that in France. English operatives ate meat freely, while the French workers didn't. He began feeding the roast beef of old England to his French employees, with the result that in a few months their output came up to English standards.

In the same way, many American business concerns are learning that the square meal is a factor in working efficiency, and that attention given to seeing that employees get it is well worth while in output, health, contentment and other ways. The plant cafeteria and restaurant is being so widely installed today that a special journal called "Plant-Restaurant Management" is now published in Chicago—it deals entirely with this subject of feeding workers. The paper-bag and tin-bucket meal, eaten cold at a greasy bench, is being replaced with warm meals served at reasonable prices in the company cafeteria. The girl who gets up too late and hurries to the factory without breakfast can eat it there before starting work. The office girl's soda fountain lunch of cake and nut sundae is being replaced by a wholesome dish of meat and vegetables with hot coffee at no more than she spends at the soda fountain, while the bucket of stale coffee half warmed on the radiator is replaced with a pint of fresh coffee for a nickel, piping hot, with sugar and milk.

(Copyright, 1922, by J. K. Novins.)

One of the big Wall Street banks has a restaurant for employees, serving four or five meals a day—breakfast, lunch and supper, with extra meals for night workers. In arranging his menus at the outset, the manager provided hearty staples like corn beef and cabbage for the husky porters, and dainty salads for the girls doing light office work. To his surprise, the husky porters would eat the salads, while the office girls cleaned up the corn beef and cabbage. A little investigation showed why. The porters live at home, and get a substantial breakfast and supper, so light refreshment at noon was all they needed. But many of the girls live in furnished rooms, have no way of cooking, and so eat cold things for breakfast and supper. In the company's restaurant they ate their main meal, getting substantial food at prices less than prevail in the kind of restaurants they could patronize.

Some months ago, while an oil tanker was being repaired in a Brooklyn dry dock, an explosion occurred, attributed to an accumulation of gas in one of the vessel's fuel tanks. Four men were killed and twice as many hurt. Had the accident come a half-hour earlier, or fifteen minutes later, the casualties might have made it a great disaster. This dry dock company maintains a plant restaurant where the employees go for a clean, wholesome meal at noon. More than one hundred men working on that ship were at lunch when the explosion took place. Without a plant restaurant they would probably have been eating a cold lunch on the ship.

Plant catering runs all the way from the setting aside of space where employees can maintain a coffee urn themselves, to the furnishing of a substantial warm meal at noon free of charge. No work force is too small to benefit by some improvement in feeding. Plant catering may begin with the serving of hot coffee and be developed as employees' requirements are learned. A couple of hundred dollars invested in a coffee urn and dishes will make it possible to sell hot coffee at five cents a pint, with some profit to be put back into the enterprise. More than any other one thing, plant caterers say, workers appreciate good coffee, and a little experience in serving it leads to buying the best coffee that can be obtained. After the coffee urn has made its way, there will be demand for sandwiches and other light food, followed by soup, and one or two meat-and-vegetable dishes. This calls for more elaborate kitchen equipment, hired kitchen helpers, and something more nearly like a restaurant, with self-serving counters and tables. With growth, the catering plan is shaped according to conditions.

There are almost as many different plant catering plans as there are business concerns giving attention to this vital matter of food eaten by employees during the work-day. In many cases, employees volunteer to keep costs within reason. A metalware factory in New Jersey, for example,

is able to serve lunch to 750 employees every day at an average of thirty cents by putting service on a volunteer basis. Cooking and dish-washing are done by hired workers, but when lunch is ready in the steam tables, women from the factory and office take turns serving. Even with the self-serve plan, there must be attendants at the counter, a considerable item of expense. Kitchen work, cleaning up after meals, breakage and the purchase of food in smaller quantities than are used by restaurants, are other outstanding items, to be kept within reason by employee teamwork. The space required for a plant restaurant is another expense, very often written off the restaurant account as a contribution by the employer.

There are three different ways of running a plant restaurant. Some concerns lease the privilege to a private operator, furnishing meals and dishes. In other cases the employer furnishes everything but lets an outsider operate the plant on a percentage arrangement. Both these plans add a profit to food, however, so in the majority of cases the plant restaurant is run by a manager working for the company, and food is sold at cost, the restaurant getting its profits in contentment.

Many industrial plants are located where it is difficult to buy good food. A large proportion of our industrial workers today are of foreign birth or descent. Left to themselves, they follow the European practice of eating small snacks through the day, usually cold, and things containing little nourishment, like fruit. Where warm wholesome food is obtainable at reasonable prices, it increases health, strength and happiness.

Work is simply energy, whether physical or mental. Human energy is food, and nothing more. It may be the muscle energy of the man who pushes a wheelbarrow, or the brain energy of the technical worker designing a million-dollar power station. No matter—the human machine will not run without suitable fuel. That fuel is food, and business concerns in widely diversified lines are learning that it pays to provide it, making certain that quality and quantity are right. Every improvement in the food available to workers on the job is an improvement in the standard of living, and shows up in improved output. To the employer, the square meal is good business—and to the worker it is part of the square deal.

The Carders' Discussion at Charlotte

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The Practical Discussion.

In addition to having a record-breaking attendance—the Selwyn ball room was filled to over-flowing—there was manifest a great interest in the discussions. "They get better all the time," and this meeting of carders was no exception, as it served, just as all the other sectional meetings have served, to further demonstrate the fact that in beginning this discussion meeting feature, in providing an idea-exchange for the mill men, the Association has struck a field fertile for development and rich in material for the achievement of greater things for the southern mill and for the southern mill man. The results of these meetings, the benefits derived from them, can hardly be estimated, their full effect can hardly be realized. The meetings are very helpful, the discussions are beneficial in themselves, and had they not another virtue they long ago would have demonstrated their worth. But one of the biggest achievements of these meetings has been the fact that they put the mill man to thinking more about his machines, about his processes, and so on, and in this manner they are uncovering a field of value to the textile industry that is immeasurable in its benefits. But suppose we get back to the Charlotte meeting and let F. Gordon Cobb, the originator of the sectional meeting plan and the present chairman of the sectional committee of the Association, tell about these things in his own way.

"I have noticed with a great deal of interest and satisfaction," said Mr. Cobb in opening the meeting, "that for the last several months all the textile papers, North and South, have been full of discussions that, you might say, came from the most recent sectional meetings we have had. It should be, and is, very gratifying to the men who have worked so hard, and to the chairmen of the different sections especially, to see this work creating the interest that it has. The very fact that the house is practically full here today shows us that the work is going to the front, and it does seem that we have struck a stride that is going to bring some direct results.

"Incidentally," he continued, "the mills of course, and especially the mills in the South, have benefited to the extent of many thousands of dollars by the work that has been started by these sectional meetings. If I had the time I could cite many instances where overseers and superintendents have reported results from their mills which have made them money, and undoubtedly our employers also are interested in that part of it.

"Of course, many of the ideas suggested have caused the overseers and superintendents to run into other ideas when they get to working on these suggestions. It is just like when you have an idea of your own regarding a machine or device, and when you get started to working on it you can invariably improve upon your own original ideas. Therefore, we do not realize, and the mills do not realize, the vast amount of good that has been done as a result of these meetings. It is just like advertising. Oftentimes it is very hard to trace the results of advertising to one certain ad, but if you are in any way skeptical about the re-

sults of advertising, just stop it for a while and then you will see for yourself.

"The main point I want to bring out is the fact that the work we have started at the sectional meetings is putting the superintendents and overseers to work, it gives them food for thought. In trying to carry out the tests and experiments that have been suggested at these meetings, the men have gotten original ideas of their own and their mills have benefited greatly. It seems to me that the carders' section has made enough progress to permit us to try to establish certain settings and speeds, etc., as standards. At least, if we can't say they are standard, we can go on record as making recommendations so that the textile papers and the chairmen of our committees will be better enabled to answer the many inquiries in a more definite way. The chairmen, as well as myself, do receive many inquiries from mills all over the South, and from the Eastern mills, too, in regard to certain of the discussions brought out at our sectional meetings, at the carders' meeting in Columbia, for example. Therefore, I hand that out as a suggestion that if it is possible to make some definite recommendations that can be accepted until we find out that they are wrong or can be improved upon, we have taken a great step forward.

"Speaking of the carders' meeting at Columbia brings to mind a fact that I tried to bring out there: that we were entering upon a period of sharp competition. I presume that the majority of people here today will agree with me in saying that that statement should now be made in the past tense, we have entered it and we are still floundering around without knowing which way to go. You know that all the trade papers and financial papers we have been reading for the last several months say that 'business is just turning the corner.' I have about come to the conclusion that it has been turning the corner so long and so doggone fast that it got dizzy until now it is like the story of the old mule I heard about. A darkey who was a very slick horsetrader sold Mose a mule, and a few days later Mose came back and said, 'Sam, that mule is blind.' 'Why do you think that?' asked Sam. 'Why,' replied Mose, 'when I turn dat mule loose in the pasture he runs right smack into a tree.' 'Naw, Mose,' explained Sam, 'You got dat mule all wrong. He ain't blind. Dat mule just don't give a damn!'

"This body of men are not supposed to study the financial end of the business, however," Mr. Cobb went on, "but I make these remarks to emphasize the work the Southern Textile Association is doing—the Association which is the only one in existence that is devoting the major portion of the programs to technical problems.

"When the margin of profit is smallest, then is when our work as superintendents and overseers looms up the biggest. I want to appeal to every man of you here to give this work every bit of support possible. The men on the different committees are doing everything they can to get all the information possible, information from widely different points and from different mills, and the work is going forward fine now, and if we keep it up we will prove that the mills are benefiting by this work and that we, as overseers and superintendents, are becoming more efficient as a result of this work, and we will be able to prove to our employers the great need of the Textile Foundation that we need so badly to carry this work on in the way we should."

Marshall Dilling, the chairman of the Carders' Division, who presided at the meeting, made a few remarks supplementary to Mr. Cobb's statements in regard to the importance of the work. "Mr. Cobb and the other chairmen have been in a position to realize the work that has been done, more than you have," said Mr. Dilling, "because the reports are made to us, we receive inquiries and information comes to us that doesn't reach you, but I realize that you can see the importance of this by the attendance here at this meeting today. I have never seen a meeting of the Southern Textile Association, either a sectional meeting or an annual meeting, when the room was filled before the meeting was called to order, as was the case today. This is the first time I have ever seen it, and it must be an indication of the interest you have in this work."

Discussion on Opening.

Taking up the practical discussion feature of the meeting, Mr. Dilling stated that the first subject for discussion was that of opening and lapping, and "we want to take up the subject of opening at this time for a few minutes of discussion." "One day last week," he said, "a man came into my mill and said 'I have come 800 miles to look into this question of opening. This is giving me more trouble than anything else in my mill and I want some better system of opening and feeding the cotton.' If this is a question that will make a man travel 800 miles to find out about it, it must be of some importance to us." Mr. Dilling then asked Mr. Cobb for a statement in regard to opening.

"At one of our former meetings," responded Mr. Cobb, "Mr. Johnstone brought out the fact that we were not opening enough cotton at a time. The majority of the mills seem to have fallen into the system of feeding the cotton direct to the hopper, opening eight or ten bales and feeding these bales direct into the hopper, and the one big point he brought out was that if there was one bale that had ten per cent of moisture in it and another that had five per cent, we do not get a proper mixing."

In following out the suggestion made by Mr. Johnstone, Mr. Cobb continued, at his mill they have gone to the expense of building a very large opening room, where they can open up 300 bales of cotton at a time. "We have this in two compartments," he explained, "that hold 150 bales each. We open 150 bales in one compartment and allow the cotton to age from 24 to 36 hours before using, and we do believe that one of the main features is that the cotton is allowed to get the same amount of moisture all through the mix. We have not brought the system along far enough to know whether we have been able to get a better mixing so far as even work is concerned, but hope to be able to give you something definite on this at a later date."

"When Mr. Johnstone brought out that point at Columbia," added Mr. Dilling, "he had especial reference to the English system, and we must admit that they have some things we could apply to advantage in our American mills, and this opening system is one of them."

H. H. Boyd, of Charlotte, suggested that Mr. Cobb explain a little further in regard to his system of opening. He said that when some men say "opening" they mean taking the bagging off the bales and letting it lie there, while others have more improved systems.

In explaining his system, Mr. Cobb said, "We have not

is able to serve lunch to 750 employees every day at an average of thirty cents by putting service on a volunteer basis. Cooking and dish-washing are done by hired workers, but when lunch is ready in the steam tables, women from the factory and office take turns serving. Even with the self-serve plan, there must be attendants at the counter, a considerable item of expense. Kitchen work, cleaning up after meals, breakage and the purchase of food in smaller quantities than are used by restaurants, are other outstanding items, to be kept within reason by employee teamwork. The space required for a plant restaurant is another expense, very often written off the restaurant account as a contribution by the employer.

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"This body of men are not supposed to study the financial end of the business, however," Mr. Cobb went on, "but I make these remarks to emphasize the work the Southern Textile Association is doing—the Association which is the only one in existence that is devoting the major portion of the programs to technical problems.

"When the margin of profit is smallest, then is when our work as superintendents and overseers looms up the biggest. I want to appeal to every man of you here to give this work every bit of support possible. The men on the different committees are doing everything they can to get all the information possible, information from widely different points and from different mills, and the work is going forward fine now, and if we keep it up we will prove that the mills are benefiting by this work and that we, as overseers and superintendents, are becoming more efficient as a result of this work, and we will be able to prove to our employers the great need of the Textile Foundation that we need so badly to carry this work on in the way we should."

Marshall Dilling, the chairman of the Carders' Division, who presided at the meeting, made a few remarks supplementary to Mr. Cobb's statements in regard to the importance of the work. "Mr. Cobb and the other chairmen have been in a position to realize the work that has been done, more than you have," said Mr. Dilling, "because the reports are made to us, we receive inquiries and information comes to us that doesn't reach you, but I realize that you can see the importance of this by the attendance here at this meeting today. I have never seen a meeting of the Southern Textile Association, either a sectional meeting or an annual meeting, when the room was filled before the meeting was called to order, as was the case today. This is the first time I have ever seen it, and it must be an indication of the interest you have in this work."

Discussion on Opening.

Taking up the practical discussion feature of the meeting, Mr. Dilling stated that the first subject for discussion was that of opening and lapping, and "we want to take up the subject of opening at this time for a few minutes of discussion." "One day last week," he said, "a man came into my mill and said 'I have come 800 miles to look into this question of opening. This is giving me more trouble than anything else in my mill and I want some better system of opening and feeding the cotton.' If this is a question that will make a man travel 800 miles to find out about it, it must be of some importance to us." Mr. Dilling then asked Mr. Cobb for a statement in regard to opening.

"At one of our former meetings," responded Mr. Cobb, "Mr. Johnstone brought out the fact that we were not opening enough cotton at a time. The majority of the mills seem to have fallen into the system of feeding the cotton direct to the hopper, opening eight or ten bales and feeding these bales direct into the hopper, and the one big point he brought out was that if there was one bale that had ten per cent of moisture in it and another that had five per cent, we do not get a proper mixing."

In following out the suggestion made by Mr. Johnstone, Mr. Cobb continued, at his mill they have gone to the expense of building a very large opening room, where they can open up 300 bales of cotton at a time. "We have this in two compartments," he explained, "that hold 150 bales each. We open 150 bales in one compartment and allow the cotton to age from 24 to 36 hours before using, and we do believe that one of the main features is that the cotton is allowed to get the same amount of moisture all through the mix. We have not brought the system along far enough to know whether we have been able to get a better mixing so far as even work is concerned, but hope to be able to give you something definite on this at a later date."

"When Mr. Johnstone brought out that point at Columbia," added Mr. Dilling, "he had especial reference to the English system, and we must admit that they have some things we could apply to advantage in our American mills, and this opening system is one of them."

H. H. Boyd, of Charlotte, suggested that Mr. Cobb explain a little further in regard to his system of opening. He said that when some men say "opening" they mean taking the bagging off the bales and letting it lie there, while others have more improved systems.

In explaining his system, Mr. Cobb said, "We have not

installed a bale breaker yet, but instead we pile the cotton up about ten or twelve feet high and scatter it as well as we can while we are piling it up, and when the man feeds off that, he gets a good mixing. We have large trucks holding two bales, and we load the cotton from these piles onto these trucks and we get cotton from different sections of the pile in this manner. The cotton is put into the pile layer by layer, and then we get a mixing that comes from the whole face of the pile ten feet high. We hope later to have a bale breaker so that we can aerate it, so to speak."

"Have you found any improvement in the variation?" asked H. S. Fowler, of Spartanburg. "No," replied Mr. Cobb, "nothing definite. As I stated, we have not been able to say definitely that we had found any improvement in variation, although we think we have."

"We have that same experience in opening cotton, but we had a system of opening 18 bales," said M. A. Crowley. "We did away with this, though, and began opening 25 bales at an opening, and we find we get much better results from doing this. We open today what we are going to run tomorrow and so on. I think we have benefited greatly insofar as evener work is concerned, and I know we have increased the breaking strength. At present we open the bales and put the cotton on the floor; I wish we had a bale breaker."

Mr. Dilling asked if anyone present had a system using a bale breaker, condenser or other type of opening machine.

"We have a vertical opener," replied Mr. Underwood, Iva, S. C., "and we open up 12 to 16 bales of cotton at a time. We tear off the bagging and ties and open the cotton up, taking part off each bale and throwing it into the opener. From there it is carried into the picker room where it drops on the floor around the machines."

"How long do you let it lie there?" asked Mr. Dilling. "We use it immediately," was the reply, "and our numbers vary about two numbers. We haven't a conveyor, and we want to arrange the picker room so we can run the cotton into the hopper." He further stated that he had experimented with opening different numbers of bales, starting with four bales and then going up to 16 at a time, and had decided on the latter method.

"The two things in the information that we have gotten on this question," the chairman pointed out, "is to get the cotton opened and get it aired. You may open it only, but it must be aired, and the only way to do that is to run it through a condenser or a C O B machine and then age it. It must stand for a period of time before you run it into the picker. You can use it just after you put it through the condensing machine, but it is best to let it age."

Mr. Boyd, of Charlotte, was the next speaker. "At our mill at Pineville," he said, "we had a lot of highly compressed cotton which gave us some trouble. They ran this through a C O B machine and direct to the pickers. Now they are running that cotton and letting it lie in a room for a day and age, as you say. If Mr. Henson, of Pineville, is here, he may be able to give you some information on that."

When called upon, Mr. Henson replied as follows: "We had a good deal of trouble with the cotton and with variation in numbers. Then we got in this new system of opening up about 12 hours ahead—we open up this afternoon what we will use tomorrow—and we find that by running it through the C O B machine and letting it lie about 12 hours that it will do a lot of good, because there is a better mix. We have not had time to find out exactly what it can do, but we know it has improved the work to let the cotton age."

C. G. Waits, of the Oakland Cotton Mills, said, "I would like to have Mr. Henson give us the variation before the system was adopted and since."

"Our yarn is about 23s," was Mr. Henson's reply, "and formerly our variation ran about two numbers to two numbers and a half. Of course we vary now, but it is only about one number on both warp and filling."

W. S. Moore, superintendent, Henrietta, N. C., gave this experience: "We have a new system installed at the No. 1 Mill where we open up 30 bales, but we do not shake the cotton up. We have the No. 4 Kitson bale breaker and vertical opener. Before, we had a great deal of trouble with the variation, and since we put in this work we find a great deal of improvement on the goods in several ways, evenness, etc. We find we do not vary more than five or six pounds on the beam anywhere, while before we used to run as high as 20 pounds. That is about the information we have been able to gather so far. We have two compartments in the system, and we open this morning what we are going to use tomorrow, and so on."

R. T. LeGrand, Shelby, N. C., followed Mr. Moore, saying, "I believe we got all that high density cotton that got by Mr. Boyd. We have found that we can't run this cotton through the vertical opener at all, without first opening it up well. We do this by hand. By putting it through the machine it loosens it more. It is expensive to tear it up by hand, I know, but we haven't the space in our picker room to do what we want to; letting it lie around in large quantities makes a big fire hazard. I have found, too, that the longer we let it lie the better it will be to run."

W. W. Cobb, Cateechee, S. C., said he would like to know if it makes any difference between the soft packed cotton and the compressed cotton, as to the opening necessary. "Now, my idea is that the compressed cotton has got to have more ageing than the soft packed staple," he added.

"You are right there," agreed Chairman Dilling. "The harder it is compressed the more ageing it needs. The softly packed cotton doesn't require as much ageing as the high-density stock."

At this point Major T. B. Lee, a civil and mechanical engineer of Charlotte, explained a system of opening and conveying cotton which he has devised.

B. R. Burnham, of Whitney, S. C., was the next speaker. "I was interested in what the gentleman from Shelby had to say about high density cotton," he said. "We have the No. 4 bale breaker at Whitney and we put through about 70,000 to 75,000 pounds of cotton a week. It goes from the No. 4 bale breaker to the Creighton opener. From there it is carried to the Morton distributor system, a distance of 50 feet, and into the self-feeding beaters on the breaker pickers. We run considerable of this compressed cotton. I don't know what the other gentleman has, but I am most familiar with the kind that we get from Texas. I do know that putting 70,000 to 75,000 pounds a week through that machine and running the vertical opener at a speed of 750 r.p.m., gets us an opening that is not detrimental to the work."

J. S. Stroud, of Cooleemee, N. C., asked this question: "Is the vertical opener worth anything for a good bender

cotton? I know the vertical opener is good for the local cotton you get around here, but is it worth while for good staple cotton, say around an inch?"

The first reply was from Mr. Hamrick, of Gaffney. He stated that when he started up the Musgrove Mill at Gaffney he put in the vertical opener and found that the laps varied two to three pounds on the picker, against a variation of from five to eight pounds before the installation of this machine. "I think the vertical opener is the thing," he said, "It opens the cotton up so good and so fine." He added, though, that he is running on local cotton.

"I would like to state for those who have not gotten up against this high-density cotton," explained Mr. Dilling at this point, "that there has been developed in the last six or eight years a new type of compress that compresses the cotton to a much higher density than the old process. Why, I've had to take an axe to open up some bales that we got at our mill!"

The next man to be heard from was L. R. Gilbert, of Raleigh, N. C., who said, "I am said to be a crank on opening, and maybe I am. At our mill we dye everything in the raw stock, and it took a long time for us to get it right. We have a bale breaker and open 30 bales of cotton at a time. We run the cotton to the dyehouse. Then we run it through a dryer and then blow it through a fan into a series of fire-proof bins, dyeing two bales from these bins at a time in a machine. We then put it into an automatic feeder that feeds it into a porcupine opener and then through a vertical opener from which it is sucked through a regulator to the breaker lappers. We have a spinning job that is the best colored spinning job I have ever seen. The spinners used to handle six or eight sides and now they run ten or twelve; some handle eighteen sides. I attribute most of it to the opening system.

"The variation we do not care about," he continued in reply to a question. "Of course it has to be even, or it would not run, but in making ginghams, we are not so particular about it as some of the other fellows. Our numbers are much evener, but just how much I don't know."

"Do you get that statement?" Mr. Dilling asked of the audience. "That as a result of the improvement in the opening system his spinners increased from six and eight up to as much as eighteen sides. And he attributes most of it to his system of opening."

The next man to give his experience was Mr. Arnett. He stated that in starting his experiments he tried opening four bales and then eight bales at a time, and got very good results both times, and then he began opening 12 bales. He raised the point, however, that in buying cotton, often a mill doesn't get all of one grade exactly or all of the same kind of cotton. To overcome this, he said, he mixes his cotton, bringing in different kinds of stock as they come in, one bale of one lot and another of another lot, until he gets four bales, one of each lot. These are put side by side and opened and torn up. Then four more bales are brought in and the cotton is placed all across the room and then four more bales are brought in. Then, when the picker hand comes in he gets cotton of every bale—a turn here and a turn there—and gets a good mixing for the hopper. "We have no trouble with unevenness," he said, "making 50s."

B. M. Rogers, Wiscasset Mills Co., Albemarle, N. C., made this statement: "We have an opening system with our H. & B. openers attached with the C O B machines. We carry it 200 feet in a pipe into the condenser. We open up 20 bales on one machine and 24 on the other, making 44 bales a day. We try to let the cotton lie there at least over-night before we use any of it. We run today what we use tomorrow. In this way we get it 'pulverized' nicely, and then we put it in the breakers and run it through. I don't know how much variation we had before this system was started, as it has been working about six years, but I am sure that it is about as satisfactory a way to open cotton as we have in this section of the country.'

"The gentleman on my right was interested in the vertical opener," said T. J. Digby, of Newberry, S. C., referring to Mr. Stroud, of Cooleemee. "I would like to give him our experience with the vertical opener. Some time ago we made a change in our mill, adding more machinery, and in order to put in this machinery, without building another building, I had to cut out one process of picking, and I installed a vertical opener.

"We have no elaborate system of opening. We first tried one plan and then another, but we do feed from a number of bales. Before we put in the vertical opener we had a darkey that ran our three breaker machines and fed the cotton off the floor where it dropped down to, and kept up these machines, and he was also able to feed them and doff them. When we made this change and put in the vertical opener, I figured on putting in an automatic feeder, but I found out that it would cost around $1200 to $1500 and so I decided I would just put in the vertical opener. When I got that vertical opener in operation the cotton was so fluffy and was opened up so nice that the darkey couldn't tend to the machines like he used to and feed the cotton into the hopper. Whenever he went and picked up an armful, he didn't have much cotton and I had to put in the automatic feeder after all. I tell this for the benefit of the gentleman who wanted to know whether the opener would open up the cotton or not and he can take it for what it is worth.

"Our spinners run from 10 to 16 sides," added Mr. Digby, and, to the amusement of the crowd, "We have as wide a variation in numbers as anybody."

At this time the chairman announced that it was necessary to pass on to picking in order to cover the subjects alloted for discussion in the available time. "However," he said, "I don't know of a more interesting subject we could discuss than that of opening."

In summing up the discussion on this subject, Mr. Dilling said, "I think you all will bear me out in saying that those of you who have been able to give a definite statement of what you have accomplished by your systems of opening and ageing so that the air can get in the cotton, and then letting it age so it will have a uniform moisture and a uniform atmospheric condition, have gotten much better results. I think you all have learned that much. I think that if we have learned that much it is something that is worth while to us. I was very much impressed with the statement of Mr. Gilbert that his spinners have increased from six and eight to sixteen and eighteen sides, and that he attributes this largely to his process of opening."

"Just one question before you get off this opening subject," requested J. R. Dover, Jr., of Shelby, N. C. "If you had a small mill and room for opening about 20 bales of cotton, would it be better to open the 20 bales at one

time or open ten or half of it; which would give the better mixing?" Mr. Dover was advised to stay a day ahead with his mixing, as it doesn't do much good to open it out of the bale and let it lie there; the great benefit comes from running it through the machine. It was suggested that he take the 20 bales of cotton and take the ties and bagging off the day before using if possible. Mr. Cobb suggested that Mr. Dover take 10 bales and give them 24 hours to age, as this will give a more even moisture content in all the bales.

Bringing up another feature of the question, E. F. Brown said, "We all know that ageing the cotton for a day will do good, but mixing the cotton according to the character, grade A, B, C, D, etc., is a good idea. I do it this way and then mix it on the apron."

Discussion on Picking.

The chairman announced at this point that the discussion would pass on to the subject of picking. "Who wants to talk some on pickers?" he asked.

"I don't want to talk any," responded W. H. Gibson, Jr., of Union S. C., the chairman of the Association's Weaving Section, "but I would like to ask for some information. How many have humidifiers in the picker room, and what are the results? We have atomizers on the finishers and we think they do good. It seems to me that we make a smoother lap and one that packs better so that the men handling it don't tear it up."

"I have tried it with the humidifiers and without them," stated Mr. Underwood, of Iva, in reply to this question. "We have put on a humidifier to each of two pickers and I find it gives good results. It feeds better. You take it in dry weather the cotton doesn't feed very well, while if you've got humidifiers in the room it will make it feed better."

The chairman put the direct question to the audience, "How many have a humidifier in the picker room?" and affirmative responses came only from the two who had given their experiences—Mr. Gibson and Mr. Underwood.

Mr. Murphy, of Shawmut, Ala., asked these gentlemen, "What per cent of moisture are you putting in the picker room?" "I only find it feeds better in dry weather and the cotton acts better on the apron, but I don't know just what moisture is going into the room," was Mr. Underwood's reply, and Mr. Gibson also indicated that he didn't know the exact percentage of moisture used.

After these gentlemen had spoken Mr. Murphy said he was particularly interested in the subject inasmuch as they were working on the amount of regain in the raw stock at his mill, and he had found that the cotton varies a whole lot in this respect. On one picker he said he might have 7½ per cent regain while on another machine half-way down the house there might be a regain of 8½ per cent.

The question of beater speeds was next brought up by Mr. Stroud, of Cooleemee, who asked, "What is the best speed for the beater on breakers and intermediates? I don't mean just 1,000 r.p.m. or 1,200 r.p.m., but the important question, to my mind, is how many times should the blade strike the cotton per inch. I know, you can run a beater slow and strike the cotton too many times and yet not hit it hard enough. As I see it, you must get everything right, run the beater at the proper speed and then have it set so it will strike the cotton the correct number of times per inch and with the proper force."

J. O. Edwards, of Lancaster, said he would give his experience: "We have 1,100 r.p.m. on our breaker beaters, and our feed rolls are making about 18 r.p.m., which makes about 24 beats per inch. Our finishers make about 53 beats per inch and the intermediates about 50. This is on 1 1/16-inch cotton, Middling or better."

"You have about the same as I have on the breaker, but I have 60 beats per inch on the finisher," replied Mr. Stroud.

J. E. Fields, overseer carding, Atlanta, Ga., also gave his experience. "We had three-blade beaters on the intermediates and were running them at 1,050 and beat the stock about 58 beats per inch. Then we took out the three-blade beaters and put in two-blade and run them at 1,150, with about 50 beats to the inch, and I believe we are taking out more motes, and I could not tell that there was any injury to our breaking strength, but I know we did get better results with the higher speed and the two-blade beater, than with the low speed and the three-blade beater, and we beat less per inch."

"Where we got that," he added later, "was in whipping it against the grid bars with a greater force than with the three-blade beaters."

Mr. Williams, of Lincolnton, said his beaters, running on 1¼-inch cotton, were making 1,000 r.p.m., and his feed roll was running 18 r.p.m.

"We will now go to the finishers," said the chairman. "The question has been asked, which is the best for the finisher, on staple cotton, the Kirschner or carding beater or the plain blade beater." (This was asked by Mr. Lee, of Gastonia, earlier in the discussion.)

Mr. Murphy, of Shawmut, replied to this question by saying, "I have not gone into this as far as I would like to, but I find that when you are trying to get strength that the Kirschner beater on the intermediates and finishers will give mighty good results, using a blade beater on the breaker. I am not doing this at present because I haven't gone into it. I want to be absolutely sure. But I have run tests on it and I find the breaking strength is increased, but, remember, you should run the beaters as slow as possible. You don't want to give the cotton a hard beating, or you will injure the staple." Mr. Murphy explained that in his mill, making duck, strength is an important desideratum. He uses ⅞-inch cotton, and has two-blade beaters on the breakers running 1,400 r.p.m.

In connection with this matter, Chairman Dilling read some data which he had secured that morning at his mill, comparing the results of the Kirschner beater and the plain beater for this purpose. "There were 60 sizings from each of them. I took the tests from the cards because I thought I could get a better average. With the carding beater in the picker, making a 40 grain card sliver, the average was 40.36. It varied from 38 to 43 grains or a variation of 12½ per cent. At the same time, and the same laps, with the blade beater in a picker, the card sliver averaged 39.46 grains. It varied from 33½ to 44½ or a variation of 27½ per cent. The Kirschner or carding beater made a 12½ per cent variation and the plain blade beater made a variation of 27½ per cent. As to the breaking strength, I do not know that at this time. This test was made from 10 sizings from six different cards on 1 to 1¼-inch cotton."

Mr. Dorn asked if that referred to the Kirschner beater in the finisher.

"Yes," replied Mr. Dilling, "a blade beater on breaker.

a blade beater on one finisher and a Kirschner on the other. No intermediates."

"How fast did you run the Kirschner beater?" somebody asked.

"The Kirschner was run at 955 r.p.m.," answered Mr. Dilling. "The blade beater, which was two-blade, was run at 1,025."

The next experience was from Mr. Brown, of Converse. "I am making a test," said he. "I cut the speed on the beaters some time ago, shutting down from 1,400 r.p.m. to 1,000 r.p.m., and leaving the feed at the same thing. At the present time I have been running about six weeks, on 20 cards, with laps made without intermediates, and the sizings are about the same thing. The spinning breaking strength has been about two to four pounds better. Middling, 1-inch cotton."

Mr. Fowler was a little stronger in his recommendation of the Kirschner beater. "I believe the day will come when the blade beater will go out of business," he prophesied, and gave his experience, which was favorable to the carding beater.

O. L. Wagstaff, of Thomasville, N. C., dissented. "I recently had a conversation with a manufacturer of pickers," he said, "and I beg to differ with the gentleman who spoke in favor of the carding beater just now. I am partial to the carding beater, but this man (the picker manufacturer) told me that they had quit recommending the carding beater for staple cotton. The carding beater curls the staple, he said, so that you will find more strippings on the cards.

"I did try reducing the speed on these beaters but I didn't know what I was doing. Another party came into my mill, looked over the pickers, took the speeds, and said, 'You're ruining your cotton' and suggested that I reduce the speed of the beaters about 500 r.p.m. I didn't think much of it, but he went to see my boss and told him about it. The boss called my attention to it, and I cut the speed of the beaters from 1,400 r.p.m. to 900 r.p.m. Everything worked nicely until the cotton reached the spinning room, where it looked like you had taken a pepper caster and sprinkled black pepper all over the yarn. Then I changed the beaters back and got rid of the trouble.

"I told this to the picker man, and he said, 'Did you change the speed of your fans?' I replied that I didn't, and he said that was where the trouble was.

"I think the Kirschner beater is far superior to the blade beater on the finisher machines, but I don't think I would like it on the intermediates. If I was going above 1 1/16-inch cotton I would investigate the curl caused by the Kirschner beater before I put it in the machines."

"That's one reason I wanted to bring this out," Mr. Dilling said when Mr. Wagstaff had finished. "There is a possibility of damaging cotton of 1¼ inch and over."

"I ran a Kirschner beater on 1 1/16 stock with very good results," said Mr. Williams, of Lincolnton, "and then on 1¼-inch cotton, and found that it curled the cotton. I ran about 1,200 r.p.m., and I put a blade beater in at about the same speed, but since that time I have cut the blade beater down to 990 r.p.m. and get better strength." This beater is set 3/16 of an inch from the feed roll, he said, in answer to a question.

"We talk about the speed of the beater, and don't say anything about the beats per inch. We talk about how fast we run the beaters when we should consider how many times per inch we beat the cotton," said Mr. Fields.

Along this line, Mr. Lee, of Gastonia, said, "When it comes to fine combed yarns, we have considerable trouble with 'neps' in the yarn, and it is our question as to which is the better, the carding or the plain beater. I have a speed of 750 r.p.m. on the breaker and 900 on the two-blade beater."

H. G. Wingate, of Gastonia, told a humorous story and stated that he had come to "collect" information. "I have had some experience with these beaters, and I have also had some experience with the 'neps'. If there's a man here who doesn't have them, I would like to talk to him, regardless of what kind of a beater he uses. But I am interested to know which would be the best beater. I have been making fine yarns for years, and I have not used anything except the carding beater on the finishers. It is refreshing for a man to be honest enough to tell something on himself. The gentleman over there says his yarn numbers vary as much as anybody's, and I'll say I've got as many 'neps' as anybody, and I would like to know how to prevent them."

"Are those 'neps' from the pickers? Could you find them a little further up in the cards?," was asked.

"There is more when they get through the pickers than there was before," returned Mr. Wingate. "I tell you, gentlemen, my observation in the past few days—and I have put in some study on it—shows me that the cotton we are getting is a lot of stuff that has a whole lot of 'neps' in it that are 'swirly' looking, like they had been pasted with paste. It looks like there were a lot of immature bolls in it. You will find a whole lot of cotton that is literally full of these little 'neps'."

Mr. Stroud said that he once had a gin in connection with his mill, and he believed that a great deal of these neps come from the gin. If a gin is in good shape, he said, there won't be as many "neps" in the cotton, but generally the country gins are not kept in good shape. "Speaking of the 'neps' in the yarn," he continued, "I think that Mr. Fields is right when he says that it depends a good deal on how many times you beat the cotton, and how fast you feed your cotton through. There is a right speed to run the beaters and then to run the feed roll, and there is a correct number of beats per inch to give the cotton."

Mr. Wingate said that in his opinion, the majority of the bad cotton the mills are getting is really injured in ginning. "As to how much cotton ought to be beaten per inch, it strikes me that that depends a whole lot on the length of the staple, etc.," he added.

Also, suggested W. W. Cobb, some mills run two processes of picking and others run three, and that has a great deal to do with it. He expressed it as his opinion that during recent years cotton has not been nearly so good, and gave as his reason the fact that fertilizer has been more expensive and the farmers have not properly fertilized the plants.

Mr. Murphy agreed with Mr. Cobb that the number of beats per inch and the speed of the beaters varies considerably with different mills. "If you are trying to get the cotton clean," he brought out, "you can hit it harder than if you are trying to get strength. I have always found that about 54 blows on the breaker and 60 on the finisher is best. The carding beater will run anywhere from 55 to 60 blows per inch. On the blade beater between 35 and 40. The carding beater doesn't hit the cotton like the blade

beater does. It has more of a tendency to comb it.

"About this cotton proposition," he went on, "we have not had any trouble this year with this badly ginned cotton, but last year we had a whole lot of trouble. It went clean on through into the roving, and made it look something like cut roving and the weights and strength went all to pieces. We found that if we bought cotton from certain dealers we hit this bad cotton. I don't believe it is all badly ginned stuff. The way I found it out was in pulling staple. I was pulling it and it would measure full, and then some of it would not draw out. We found most of that cotton was coming from Mississippi and Texas. From North Georgia and Tennessee we got good cotton."

Mr. Boyd reported that he has been running 5/16-inch cotton and has not had any trouble with "nits," although he stated he had no combed work. He added further that they run 50 beats per inch on the finishers. He then suggested that it might be a good idea to have the men investigate certain features of their carding and report back, and Mr. Dilling asked the men present to get certain points on their work and bring this information to the next meeting. The points he desired from each man are: the kind and length of cotton being run, the number of revolutions per minute made by the beaters, the number of beats per inch the cotton is receiving, and the type of beater.

W. W. Cobb asked for the opinion of those present in regard to the plain and pin grid bars, and a few expressed themselves as preferring the pin grid bar.

Discussion on Carding.

Chairman Dilling stated at this point that because of limited time the meeting must pass on to a discussion of the card, and he brought up the question of variation in card sliver.

"I have tested out this matter thoroughly," replied Mr. Lee, of Gastonia, "with a 14-ounce lap and with an 11-ounce lap. With the 14-ounce lap I made a 42-grain sliver and had a variation of 12 grains. With the 11-ounce lap, I had a 34 grain sliver with about eight grains variation. I find that my numbers run about one number closer with the lighter lap." He didn't change the draft on the cards, he replied to a question. He has a card draft of 125, he said.

"At the Gastonia meeting of spinners," reported Mr. Edwards, of Lancaster, "several called for reports on card weights, and I have had a test made in three mills which I will read to you. These tests were run over the period from November 15th to January 18th, and were made by a graduate of Georgia Tech, and I believe he gave every side a just test."

The tests showed that on some of the cards, the variation ran as high as 48 grains, making a 48-grain sliver. "We have had it as low as 28 grains a lap, taking the weight just as it comes from the cards. The average variation in weight was 34.9 grains on a 48-grain sliver. On the middle of the lap we weighed that after it had been put through the cards and we found 12.6 variation in grains for the period from November to January, and that was taking the extreme weights.

"This was taken from different cards from three mills, and it was a fair test; it is not from one or two cards, but from every card in each of the three mills. That makes about 25 per cent on the middle of the lap and about 70 per cent on the lap."

"Let's get that straight now," suggested Mr. Cobb. "That test covered a period of a number of months, and you will please note that the variation he found has been in the operative—that is it was caused by the operative and not by the machine. The variation from the machine was almost negligible, but the variation caused by the man who lays the lap on the card is where the variation is going in that is very great. It is probably surprising to see that high a variation but after the reports had begun to show up and the card hands saw what they were doing, and when the overseers began to instruct the card hands in how to do the work properly, the variation decreased over 50 per cent.

"It may seem absurd that a man who lays a lap on a card could get 100 per cent variation, but if you do not believe it, try it out in your own card room. The variation will be in the man who lays the lap, and he should be very careful not to have a wide variation there, and therefore we should work out and teach the operative to lay his lap better. In the strippings we also find a great variation, and in some of the mills—in fact these tests have been carried on in more than three mills—in the strippings, after a card was stripped with the vacuum system, if they would let the sliver run out on the floor until after they had two other cards stripped, then the sliver is back to its normal weight. It was not the variation on the card and not in the lap. It is the variation caused by the operative, the man who is running the card, and I believe that if you get to working it out you will find then where the greatest variation is. This system has been carried on through the drawing and each process in the mill. If it were possible to take all the card sliver that you have, just where the laps had been laid and put them in the spinning frame, you would have some time running them. That's the thing we ought to work on and get a report on at the next carders' meeting, to see what you find."

Mr. Wagstaff said he wanted to thank Mr. Cobb, that he had been looking for that same thing for two years, and now he knows where to find it.

Mr. Todd said he had made a test for sliver variation on 30 cards, and had found a variation of about six numbers. His sliver was supposed to be 47 grains from an 11-ounce lap, he said, and "in making this test I made three sizings from each can off of each card, and found a variation of 14.3 per cent, from the highest, about 51 grains, to the lowest, which was about 45 grains."

J. A. Chapman, Jr., of Inman, S. C., raised the point as to whether this test was for a period of one day, and continued, "I made that same test over a period of six weeks, from 53 cards, and found a variation of 30 per cent."

Mr. Lee said he has tests made lasting over a period of a week, and made twice a day, and he found about 15 grains variation in a 34 grain sliver.

A mill man present brought up the following point: "I want to state a little experience I had. I made a test of about 20 sizings from one can, and I got a variation of 10 grains (from a 48-grain sliver). I want to know if anyone else gets that same variation, nuder the same conditions."

Edwards said he made the same kind of a test, sizing a can all the way through, and found eight grains variation from a 48-grain sliver.

"Before we get away from this subject," said Mr. Cobb, "I want to read you the weights taken from the middle of a lap on a standard 48-grain sliver. These are the weights, 52, 47, 48, 51, 48, 50, 51, 47, and so on down the line. In other words, there is only a small variation there; the highest was 52. But where the great variation came in was in laying the laps. In other words, if you get your lap anyways even at all the variation after it is started on the card will not be great, but if you do not have your card hands lay the laps right, you are going to have a great variation."

Mr. Todd asked whether steel or wooden lap pins were used on the cards in these tests, and Mr. Edwards' reply was "steel."

At this point Mr. Dilling reported on a recent invention for the purpose of regulating the amount of sliver fed immediately after stripping. This device he said is attached to the side shaft of the card, and he read some comparative figures on the variation in sliver on a card equipped with it and one not so equipped, and stated that if it is what is claimed, it will really be a great help, for "a great deal of unevenness can be made by this source. Let the sliver from the card after stripping run onto the floor and then have it put up."

The question of long and short drafts was brought up by Mr. Lee, who asked the question: "Which is best, the short draft or the long draft on a card?"

Mr. Todd replied that he has a draft of 103, and finds it very satisfactory. He has been up as high as 110, he says, and down as low as 90 and 95, but he does not like it at 110.

"Was the cleaning as good at 100?," asked Mr. Lee. "I couldn't say," was the reply.

"I have a draft of 95," answered Mr. Edwards, and continuing, said, "While I am on my feet, I want to ask a question: How many men here weigh the strippings from the top flats? What do they weigh?"

Continuing the discussion on card drafts, Mr. Dilling asked how many were using a card draft of 100, and how many used 125. Approximately 20 indicated they were using 100, and a like number were using 125, apparently.

The chairman then asked if anyone who was using 100 had ever tried a draft of 125. One man replied that he had found that on 7/8- to 1-inch cotton, he didn't get any better results with a draft of 130 than with a 100 draft.

In reply to a question from Mr. Lee as to whether anyone had used a draft of 100 making fine combed yarns, Mr. Todd, who indicated he was using this draft, said it was for 38s hosiery yarn.

A mill man present said he once went into a card room and found the work running badly. An investigation showed that there was a draft of 129 on the cards, he said, and when he cut this down to 103, the work improved greatly, and the hands commented upon how much better the work ran. This was on 1 1/16-inch cotton, making about a 40-grain sliver.

W. B. Pratt, Charlotte, raised the point of how the work was improved by decreasing the draft. He explained that this was the only combing action received in "carded" work, and said he advocated as long a draft as possible. One mill man said he noticed that a smoother web was made with a shorter draft, and when asked by Mr. Pratt how much he changed the weight of the lap, he replied that he didn't know, but that he ran the same weight card sliver.

David Clark, of Charlotte, brought up an interesting point at this time. He said he noticed that only three men held up their hands indicating that they had ever tested out a draft of 125 on their cards. "This looks mighty bad for the Carders' Division," he declared, and stated that the men should investigate and find out which is best and then use that. He cited an instance of a man increasing his draft from 100 to 125, and increasing his breaking strength considerably. This was from 1-inch cotton.

Mr. Todd answered this by saying that he had found a draft of 103 so good that he didn't feel like taking any chances with 125 or anything else.

Mr. Lee said his observation was that cleaner work could be secured with a draft of about 125 or 130. He uses 1¼-inch cotton, and said that after changing his card sliver from 42 to 34 grains, his yarn looked 25 per cent better. He runs an 11-ounce lap making a 34 grain sliver, and cards about 40 pounds a day. He also indicated in this connection that he increased his doffer speed from 6 to 8 turns.

A carder brought up the point that a man carding 75 or 80 pounds a day could use a draft of 125 all right, but stated that when a man cards 125 pounds a day, he will find 100 better than 125.

The question brought out by Mr. Edwards in regard to strippings at the top flats was taken up, and Mr. Moore, of Clover, when called on for a statement, said, "My experience has been that the better you work your cotton at the pickers and at the back of the card, the more strips you will have."

That subject of "neps" came up again at this point, and Messrs. Fowler and Todd suggested that if the cards are set properly and stripping is done sufficiently, there won't be much trouble with "neps." "I'm not bothered with 'neps' at all," Mr. Todd advised.

"What're your card settings?," came the request of several of those who are bothered with these "neps."

"Certainly," agreed Mr. Todd, going in his pocket after them. "I am running California irrigated cotton, about 1⅛ inch and I set

Doffer to cylinder,7.
Licker-in to cylinder, 10.
Top flats, 9.
Feed plate to licker-in, 12.
Mote knives, 12 top; 10 at bottom.
Back flats, 17 bottom; 22 top.
Stripper plates, 34.
Screens, front, ¼ inch; middle, 34; back, 12.
Comb to doffer, 22.
Stripper comb, 34.

This California irrigated cotton is something like Peruvian, if you know what that is, very hard to work." Mr. Todd later stated that he makes 38s hosiery yarn.

"Mr. Todd is making hosiery yarns, and so am I," said Mr. Wagstaff. Still, he explained, if 1,000 ends of their yarn were put on a warper creel, he had no doubt but that they would show up plenty of "neps." The hosiery yarn, he stated, does not go to the warper, and consequently is not put in such a place where the "neps" would be so apparent. To this Mr. Lee, the combed yarn man, assented.

Mr. Andrews brought out the fact that it "is a good idea to know what our cards are set to, and to see that they are kept set to the proper settings, and that they are kept

sharp. If the cards are not kept sharp, you will have 'neps'." He suggested a weekly inspection of the cards on the part of the overseer.

"Is anyone making 50s or finer without having 'neps'?," asked the chairman.

No response.

E. M. Terryberry was the next speaker in connection with this "nep" proposition. "I have been traveling on the road for a long time and have come in contact with a good many carders, and have had some experience in the mill business myself," said Mr. Terryberry. "I find that a great many of the mills that were equipped for coarse work have been changing over to other kinds of work. This calls for a different grade of cotton, and a good many of these mills have gone onto finer work, and the result is that they have their cards equipped with a coarse wire." Mr. Terryberry expressed it as his belief that this was the cause of considerable of the "neps" found in many of the mills. He advised a finer wire for the mills running on the finer numbers of yarn. Mr. Terryberry further stated that he finds a good many carders stripping the cards only twice a day, and said that those who strip three and four times are getting much better work. In this connection further discussion of the subject of stripping developed the fact that the men generally seemed to be in favor of stripping either three or four times a day.

"I would like to ask: which is the best to use, a heavy lap and a long draft, or a light lap and a short draft?" asked one mill man.

One superintendent stated he had tested both thoroughly and had been able to see no difference.

Mr. Dorn stated he is using an 11-ounce lap making a 42-grain sliver. "About stripping cards," he went on, "we strip our cards three times a day, and strip every other card and wait an hour and a half and strip the alternating ones. That gives it a chance to average up. It takes a long time for the sliver to get back to its normal weight after stripping. You can't do it in ten or fifteen yards."

The chairman next brought up the question of the quality of the present year's cotton crop, and asked if anyone had found a difference in quality between this year's cotton and that of previous years. "If so," he continued, "did you find it better or worse?"

"Worse," was the general consensus of opinion.

The chairman asked Mr. Cobb in what particular respect he had found the difference, and the reply was in a falling off in breaking strength.

"How much?" asked somebody.

"To express that in percentage," answered Mr. Cobb, "about ten per cent."

"I find, in trying to get information from a number of mills in regard to this," continued Mr. Cobb, "that they would report there was no difference in the breaking strength. Then we would get samples of the yarn and break it on an automatic machine and then the difference would show up. You know, with the hand testing machine, it is easy for a man to vary the speed and make the yarn break at just what he wants it to."

"Our experience has been that 1919 was the last crop of good cotton," reported Mr. Stroud. "With North Georgia cotton our breaking strength has gone off from 1920 until this year, when it is lower than it has ever been. However, our weaving production has not fallen off, but we feel that with the same efforts we are putting forth now, it would even be better if we had the usual grade of cotton."

"We use North Georgia cotton and find it varies from ¾ to 1 inch in some bales," added Mr. Dorn.

"Has anyone noticed any difference in staple cotton?" asked the chairman.

"Our work is running better," responded Mr. Williams, of Lincolnton, "and I haven't noticed any difference in the breaking strength."

Mr. Boyd brought out that there has not been so much difference reported in staple cotton as in the local types. He stated further that this depends to a great extent upon the point from which the cotton is secured and "who you buy it from."

Mr. Willis asked the meeting if anyone was using California cotton, or Arizona cotton, but there was no response to either question.

Discussion on Drawing.

"We'll go onto the subject of drawing now," announced Mr. Dilling, and the first question, from J. S. Stroud, superintendent, Cooleemee, N. C., was "What size holes should be in the trumpets for a 55-grain sliver?" He continued by saying that the holes in his trumpets were worn larger, causing variation in the yarn.

"I haven't that information at hand, but I can furnish it to the gentleman if I get his name and address. This would be manufacturers' standards that I would furnish him," said B. R. Burnham, Whitney, S. C.

In regard to the size of the hole in the trumpet, said Mr. Gilbert, "a 3/16-inch taper reamer is what is used by the machinery makers, and it depends on how big you want the hole."

Mr. Rhyne added that "We tried it out on our combers just to see what a 55-grain sliver would actually go through, and we found it to be 5/32 of an inch."

A problem and its remedy was related by Mr. Todd at this point. He said they were having trouble with soft places coming through in the spinning, and they went over all the machinery in an effort to locate the cause. Finally, he said, they found it in the top clearers on the drawing frames. After removing the ratchets on these clearers he cured the soft places and none have since been seen.

The chairman next asked how many present were using two processes of drawing. The majority indicated that they were using two processes. He then asked if anyone had changed from two processes to one process. Jack Donaldson stated that one-process drawing "is all right on 18s to 22s, using a breaker and finisher picker."

Mr. Burnham reported a test with one-process drawing and stated that they were not able to secure the proper breaking strength and evenness of yarn with it. Another superintendent reported a similar experience.

In reply to questions, Mr. Burnham stated that with two processes, his front roll speed was 318 r.p.m. and that he used a front roll speed of 250 r.p.m. with the one process.

Mr. Wagstaff said he once changed from two to one process drawing and then changed back to the two processes. He said that during the war they had no trouble using one process, but that when the yarn market went dead they had to put back in the second process.

Mr. Lee reported changing with no evident difference in the breaking strength. David Clark, of Charlotte, stated

that Mr. Rankin, who recently purchased the Modena Mills at Gastonia, had told him they had changed from two-process drawing to one-process drawing and that the breaking strength, on 30s yarn, had gone up six pounds.

"At our mill we are figuring on changing from two processes to one process," said Mr. Underwood. "I'm against it. We are getting mighty good results from two processes on 22s yarn, and I would like to have the matter thrashed out thoroughly and let someone see it who is not here."

At this juncture Mr. Dilling brought up the point that the number of processes in the drawing will often be governed by the number of the roving frames. He then gave the results of a questionnaire including a question on this matter, saying that this questionnaire showed that "in a lot of combed yarn mills they were decidedly in favor of one process, and in the carded yarn mills the opinion was more or less divided." The preference of the combed yarn mills for one-process drawing is explained in the fact that they secure an extra set of doubling on the combing operation.

Discussion on Roving Frames.

The meeting then entered into the subject of roving frames, the last feature to be discussed at the session. J. E. Fields, of Atlanta, was the first speaker on this subject, reporting a test he had made in regard to reducing the spindle speed on slubbers.

"We are making a test in which we reduced the speed of the jack shaft from 290 to 260, and found that we get an evener roving. From the standpoint of yarn numbers and evenness of the roving, we will get an evener yarn and a stronger yarn with the slower speed on the slubbers."

Mr. Moore, of Clover, was called on for a statement. "We make fine counts in our mill," he responded, "and use four processes of roving. I cannot give you anything definite except that in making a high-grade yarn, you must keep the roving machinery very clean. We found that when we cleaned the frames while they were running we soiled our roving, and therefore we clean the roving machines while they are doffing so that all the soiled roving is removed by the spinners."

Another experience in reducing slubber speeds was related by Mr. Burnham, of Whitney. "We cut our spindles on the 8 x 3½ speeders from 1,090 to 980 r.p.m. and took out twist to maintain our front roll speed, with very good results in the spinning room."

The next question from the chair was, "Is anyone running spindles or flyers faster than the catalog speeds?" No response. "Has anybody improved their work or gained any advantage by increasing the speed of the roving frames?" No response.

Then this conclusion from the chairman: "I think the roving frame is the one machine in a mill on which it has never been found profitable to run higher than the speeds recommended by the builders."

"Well, what advantage has anyone gained by decreasing the speed?" was his next question.

E. G. Waits replied as follows: "On the slubbers and intermediates I decreased the spindle speed and raised the front roll speed back by taking out twist. On the slubbers I had two teeth of twist above standard, and I put standard in the slubbers and was able to take out two teeth of twist on the speeders. I believe I get a stronger roving. It does make an evener roving. I was also able to close the rolls on the intermediates some after taking the twist out of the slubber roving."

Mr. Burnham asked the question, "Has anyone present run less twist than the catalog calls for on Saco-Lowell frames?," but there was no reply.

W. W. Cobb asked the question, "What are good roll settings for 1 1/16-inch cotton on slubbers, inermediates and speeders?" to which E. G. Waits replied:

"I am making 85 hank speeder roving for 6.45 filling. Front roll, 1⅛ inch, back to middle, 1 7/16 inch. These settings are from center to center of rolls. On the slubbers, we make a 75 hank roving, draft 4.50, the back to middle rolls are set at 1¼ inch; middle to front, 1¼ inch; we close up a little on the intermediates, and set the middle to front rolls at 1 3/16 inch."

Robert Huskey, of Whitney, S. C., brought up the question of whether a standard setting for rolls on roving frames was practical.

"What do you mean?," asked Mr. Cobb.

"To have a certain setting as standard," explained Mr. Huskey. "For instance, we run this roving and then that. The more bulk that's going through, the wider the rolls must be, and the finer the roving the closer together the rolls should be, and I can't see where setting the rolls at a certain distance can be gotten at."

The amount of twist also governs the distance of the rolls, Mr. Dilling explained, "and so does the speed," added Mr. Cobb.

The next question was "Which gives the best results, leather covered rolls or metallic rolls? We are using 1 1/16- to 1 3/16-inch staple."

Mr. Lee replied that he had had considerable experience with both kinds and that he prefers the leather covered rolls because "I think you get stronger yarn and better results all the way around."

The next and last question asked in the practical discussion was from J. B. Parker, LaGrange, Ga., who asked about the tension on drawing, slubbers and intermediates. The reply given was that "it is best to have a slack tension, if it is not too slack."

This concluded the practical discussion, and in bringing the meeting to a close, Chairman Dilling, who has so faithfully and ably served the Association as Chairman of its Carders' Section for the last three years, expressed his appreciation to the men for their interest and cooperation in the work. "I have served on this committee for three years, and my term soon expires," he said, "and I want to thank you for the interest you have taken in this work. It has been a great benefit to me, and I am sure it has been to you; we have accomplished a great amount of good."

Dinner and Entertainment.

A delectable meal was served to the visitors at 6:30 o'clock in the assembly room of the new Chamber of Commerce Building on Fourth Street, during which entertainment was furnished by a troupe of black-face artists under the direction of Earl Fite and his orchestra, of Charlotte.

After the meal was finished, the men were given quite a treat. A moving picture screen was put up across the stage, and a set of moving picture films taken in one of the mills of the B. B. & R. Knight, Inc., of Providence, R. I., were shown. These films were very interesting to the mill men. They started with the picker room in the mill, and followed the cotton through each process in the mill, show-

ing common practices among mill operatives in performing their work incorrectly, and then carrying this on to a subsequent process and showing the effect of it later on in the mill.

For instance, one scene showed a careless operative allowing oil to get on a bobbin of roving, and then showed this same roving, after it had been put into yarn and on the loom, coming through in the form of streaky or oily filling in the cloth. Another showed a careless picker hand making waste in taking a full lap off a picker, and then another view would show the correct way of performing this operation. These illustrations and examples were carried on through the mill into the weave room, where, for example, it showed a loom-fixer swaggering down the alley to a stopped loom, throwing his greasy monkey wrench over on the cloth and carelessly rubbing his hands all over the goods, making greasy and dirty spots on them.

Another view showed a girl blowing off a roving frame and making gouts in the yarn. Another time a happy-go-lucky sweeper would come down the alley, swinging his broom around any old way and blowing the lint and waste up off the floor. Another showed an operative making a bad piecing-up, or a high piecing up, and then the effect of this, and the correct way to perform the operation.

These pictures were taken originally for the purpose of displaying them to mill operatives, to show them the advantage, not only to the mill, but to themselves, of performing the various operations in the mill so as to eliminate bad work. They were made under the personal supervision of Stoney Drake, and it was announced at the Carders' Meeting that any mill in the South desiring to secure these films for exhibition to their operatives, may do so upon application to the Drake Corporation, Norfolk, Virginia. Mr. Drake states that he will be glad to lend the films to any mill without charge, except that the mills shall pay the express charges on them to and from their plants.

British and American Practice Contrasted

BY SIDNEY B. PAINE.

The subject of manufacturing methods, the question of what style or kind of process is best for the various processes in the mill, the advantages of using a certain type, is an interesting one to the mill man, and its features are invariably discussed when these men get together. In the sectional meetings of the Southern Textile Association, for example, discussion long and argument lasting is heard relative to the merits and demerits of two-process picking as compared with three processes; or perhaps there will be a discussion between a mill man favoring two-process drawing and another man who tells how he gets best results from three processes, maybe another man says one process. And so on, the advocates of each system get the advantages of them all through a comparison of their methods.

An interesting summary of the contrasts in methods between American cotton mills and those in England was presented by Sidney B. Paine, in a paper prepared for the Symposium on Textile Manufacture and Economics, held in Philadelphia, Pa., on February 28 under the joint auspices of a number of civic associations of Philadelphia and textile and other associations and societies.

Mr. Paine's conclusions and comparisons, as presented in this paper, were formed following a thorough study of English methods and practices while a delegate from the American Society of Mechanical Engineers to the Second World Cotton Conference which was held in England during June of 1921. He made it a special feature of his trip to meet a number of English cotton manufacturers and discuss with them the conditions under which their mills are operated and the reason for their preference for the types of machinery used in the different processes, and in his address, he made a comprehensive comparison of English and American textile manufacturing conditions, taking up separately the picker room, card room, spinning, sizing and weaving.

Before going into the details of this subject, Mr. Paine called attention to the advantages with which England is generally accredited, by reason of the unusual natural humidity which she enjoys. For this reason means for artificial humidification are not supplied to the same extent as is necessary in America. In these conditions, declared Mr. Paine, we find the explanation for much of the difference existing in the manufacturing practices and machinery in the two countries.

These differences, however, are interesting from the standpoint of comparison, and portions of Mr. Paine's paper discussing these differences as applied in the various departments of the mill are appended:

Picker Room.

It would seem to be the common practice in England to depend more upon the use of air to clean the cotton than upon mechanical means. It is claimed that the beater breaks up the leaf into small particles which it is almost impossible to remove in the card, and that this results in "specky" roving and yarn. On this account, what we call the "picker room" is generally known as the "blowing room." In America, as a rule we use the same pickers on all grades of cotton, with the possible exception of the longest staple. In England, the type of machinery which is to be used in the picker room is determined largely by the character of the cotton to be used, and the "blade" beater is used much less generally there than in America. "Mixing" starts at the bale-breaker, and the intermediate picker is frequently omitted, while the principal function of the finisher picker seems to be to perfect the mixing.

It would appear that the Englishmen pay more attention to the air conditioning of the cotton before it goes into the pickers. Oftentimes the cotton is left in the air conditioning room three to four days, and in some cases a week. It is claimed that the air conditioning is very important as it affords an opportunity for the fibers (which have suffered from the severe compression in the bale) to straighten, thus reducing the work of the card and strengthening the roving and yarn. It was claimed that where this air conditioning process is not used and where the cotton is rushed through the several processes from the bale-breaker to the spinning frame, there is no time for the fiber to straighten itself, and, consequently "fluffy" yarn is obtained, which is bad for printing and must be weaker than if the fibers are all twisted together.

Card Room.

It is the English practice to use three processes of drawing—sometimes four—while in America the usual rule is to use two, and sometimes three processes. In the place of one long back roll on the drawing frame (as used in America) under which six slivers pass, in some cases two short rolls are used, beneath which three slivers pass. Inasmuch as the Bodden flyer has been supposed to have been universally used in England, we were much surprised to find in one mill some Dunn flyers on roving machines.

Ring Spinning.

Tapes are used much less than bands for driving the frames.

Double cylinder frames are more frequently found than in America.

In quite a number of cases in England, and on the Continent, the spare bands are stored in the spinning room rather than in the store room. This would appear to avoid the tightening of the bands as soon as they are applied, due to the absorption of moisture.

As a rule their spinning frames are much longer than those found in our American mills. It is not uncommon to find frames of 550 spindles. This is true also on the Continent. Twelve years ago I found this practice carried to the extreme in one mill, where one frame, apparently having over 800 spindles and driven from each end, occupied the entire space across the mill except an alley along each wall. Examination showed that two frames had been joined together, the cylinders, however, being separated by a small space. The object was to utilize the center alley. It might be inadvisable to use these long frames in our older type mills, as, due to the settling of the floors and shrinking of the timbers, it might be difficult to keep the farmes in alignment. Our modern concrete mills, however, are as solid and rigid as the English mills and there would be no more difficulty in such mills than is found in the English mills, where the practice seems to be increasing.

Some American manufacturers have not adopted the longer frames, as they claim that by that method too many spindles are stopped at each doff. Inasmuch as in all large spinning rooms there are at least two doffing gangs, it would seem feasible to combine the gangs and not stop any more spindles than if the two gangs were working separately. I was informed that double roving is used to a larger extent, even on medium numbers, in England than in America, but I was unable to verify this statement.

The short traverse and filling wind is used almost universally in English mills. This has led to modifications in the spooling and winding but limited time did not permit sufficient study to enable me to make any comparison between English and American practices. I was informed, however, that the use of cone and ball winding machines is developing faster in England than in this country.

Slasher Room.

In one mill which we visited, where white and colored warp was being used, we found two sow boxes on each slasher—one for the white yarn and the other for colored yarn. It was claimed that the white and colored yarns may require different sizing mixtures. Furthermore, if perchance the dye is not absolutely fast on the colored yarn, the starch in the sow box for the white yarn may be discolored.

Referring incidentally to the practice in Holland, we were shown the prints of a slasher, although we did not have the opportunity of seeing it in operation in a mill, which differed quite materially from the type commonly found in America, in that the yarn from the section beam passed around a steam heated drum before going to the starch box. It then passed through what appeared to be a hot air dresser before being wound on the center beam. It was claimed that especially on dyed yarns the abnormal humidity to which the yarn had been necessarily subjected, in passing through the preparatory processes, is not required nor is it desirable when the yarn reaches the slasher, and should be removed before the yarn is starched, or filled, in order that the entire capillary power of the yarn may be free to absorb the starch or filling, which otherwise would not penetrate the yarn but merely coat it superficially. Photographs of the cross section of the yarn treated by the Dutch and American practices seem to confirm this conclusion. It is claimed by the advocates of this system:

1st. That the production on this type of sizing machine is higher than that which can be obtained on the best cool air slasher; 2nd, that there is no sticking of the yarn to the guide rolls; 3rd, that the tension on the yarn on the guide roll is reduced to the minimum; 4th, the thread remains rounder and fuller; 5th, less driving power is required; 6th, full boiler pressure can be used up to twelve atmospheres.

Weave Room.

It is in this department that we find the greatest difference between English and American machinery. While there are some underpick looms in use in England, the standard loom is of the overpick type.

The overpick loom is the natural outgrowth of the old hand loom and its shuttle action is practically the same as on that earlier type, as the picking stick moves horizontally and is attached to the picker by means of the picker strap. In both cases the picker slides along a rod on the top or side of the shuttle box, depending on the type of loom. By reason of its construction, the picker stick on the overpick loom is under full speed when it starts the shuttle. Consequently the speed of the shuttle as it passes through the shed is more uniform and also slower than on the underpick loom, on which the picker stick and shuttle start at the same time. There is comparatively little rebound of the shuttle in the box as the friction of the picker along the rod tends to check the speed as the shuttle enters the box, and the binders are not set so tight as in the underpick loom; consequently less power is required to drive the shuttle. Because of the lower maximum shuttle speed, and the reduction in the binder pressure, it is claimed by the advocates of this type (the claim is admitted by some American loom manufacturers) that the shuttle action is "easier" or "sweeter" on the warp. Most of the looms of this type are equipped with a loose or swinging reed, which is locked automatically just before it meets the fell of the cloth or last pick. It is claimed that this construction prevents almost entirely the "smashes" which are experienced with the tight or rigid reed. I would add, however, that some English looms are provided with the same means of protection as are found on our American looms. The crank shaft on the overpick loom runs in the opposite direction than on American looms. I

have never heard the reason for this difference On account of the shape of the harness cams the movement of the harnesses is more uniform. Our own manufacturers, however, will furnish any cam that may be called for.

The Englishman seems to pay more attention to "covering" than we do, although I have seen some beautiful specimens made in our own mills.

Cop filling seems to be used very generally in England, as four-fifths of her spindles are found on mules. This permits a lighter package and a lighter shuttle, thus causing less strain on the loom, due to the shock of the picker stick, and reducing the power consumption.

On the underpick loom the danger of accident due to the picker stick is not present. I have heard of one mill in this country where only a few weavers could be hired to work on the English loom, partly on account of the danger. It also avoids much of the damage from oil. On the overpick loom the spindle, on which the picker slides, must be lubricated frequently. Although it is wiped, the dirt and lint accumulate and finally a ball of dirt is projected into the shed.

With all its good features, the overpick English loom, as it stands today, would not meet our American conditions as well as does our standard automatic loom. If we should use their type entirely, half of our looms would stand idle, as we would not have sufficient weavers for our requirements. Without radical modifications in design we could not equip our automatic bobbin changing looms with the overhead picker stick and attachments, as our magazine occupies the same place on our loom as does the picker stick on the English loom. But are there not some features which could be adopted to advantage on our looms?

On some Dutch looms the warp stop motion was omitted as it was claimed that it injured the yarn, and especially because it was unnecessary if perfect yarn were spun. They may be successful with it because the weaver rarely tends more than four looms without a helper. Without this device he could not operate ten, fifteen or twenty looms, as we do in this country.

One manufacturer criticized the readiness of Americans to adopt automatic devices. He did not understand that we have been forced to invent means by which manual labor could be supplemented.

The foregoing discussion is limited to single shuttle looms. They are using successfully the multi-box looms.

The Water Buffalo.

It may seem strange that there would be any connection between textile manufacture and this wild, ferocious animal of the Far East, and yet, in a most interesting book with this title, which is being sent out to the textile mills, the Garland Manufacturing Company, of Saco, Maine, who make loom pickers and loom harnesses, tell in a very engaging manner the story of the water buffalo, from which they obtain hides for making rawhide loom pickers.

The book is prepared in an unusually attractive style, is printed on coated stock, well bound and profusely illustrated with natural color photogravures. It takes up first the water buffalo, its habits, characteristics, and habitat, treating both the wild type and the domesticated animal, and other details of interest concerning the animal, about which very little, aside from a technical description of the animal, has been published heretofore.

The second chapter of the book tells of the uses to which the buffalo is put as a beast of burden. The animal possesses unusual strength, we are told, which enables it to do an enormous amount of work. Its principal adaptation is in the rice fields, for which service it is well adapted. The third section of the book explains why the hides of domestic American cattle are unsuitable for loom pickers, because of their thinness and a lack of the toughness and strength characteristic of the buffalo hide, and states that the hides of buffalos, which because of their thickness and coarseness make an inferior grade of leather, still are excellently suitable for making rawhide or "buffalo" loom pickers on account of their strength, thickness and elasticity, and, because of their being unsuitable for leather, cost less than hides which can be used for tanning and other purposes. This chapter also deals with the conditions governing the supply and quality of these hides, the importance of drying the hides, the collecting and marketing and other interesting topics.

The fourth and last chapter of the book explains the methods of preparing hides for picker purposes.

This story of the water buffalo will doubtless be of interest to many textile men, and its excellent arrangement of material, together with the strikingly good illustrations, make this book one of the most attractive publications of its kind that has come to our attention in some time.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., have recently issued color cards on the following four new dyes:

Pontamine Fast Black L, a direct black dyestuff for producing shades ranging from pearl gray to blue black; recommended for dyeing of grays and slates and for fashion shades on cotton yarn and piece goods.

Du Pont Congo Red, a direct color of bright, clear, red shade, for use on cotton in the production of cheap, turkey red shades where a poor fastness to light and acids will not handicap its use; has moderate solubility, and its use in machine dyeing is very limited.

Pontamine Fast Gray B, a direct, dyestuff of fine greenish shade, recommended for producing grays on cotton yarns, tops, etc., and padding piece goods because of good solubility.

Sulphogene Yellow D, a reddish shade of sulphur yellow which can be used for full yellows on cotton, linen and all vegetable fibers, and for producing drabs, tans, olives, greens, browns, etc., in combination with other Sulphogene colors; recommended for padding; and, it is stated, is well suited for dyeing in open kettle or in machines for raw-stock, yarns, warps, beams, and pieces.

Fortunes can be made in depressions as well as in periods of prosperity but they are made by a different class of people and by different methods. In periods of prosperity the borrower, the speculator, the trader and the agitator prosper most. In periods of depression the lender, the investor, the builder and the producer succeed. The opportunities in 1922 will be for those in this group who substitute thrift for extravagance, industry for indifference, efficiency for inefficiency, honesty for dishonesty, and service for selfishness.—*Roger W. Babson.*

Cotton Mill Lighting---Part III*

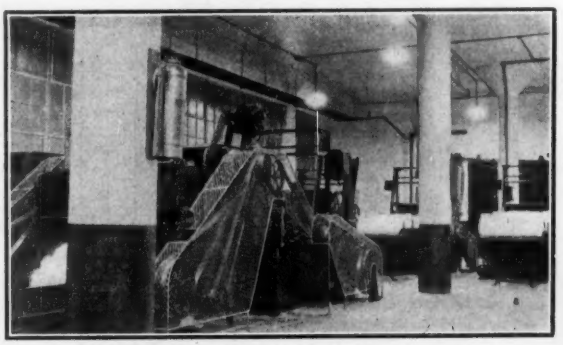
BY JAMES M. KETCH.

Standardized Illumination.

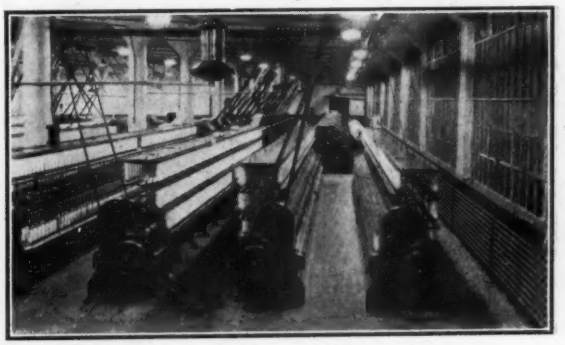
Standardized illumination has followed close on the development of such standardized lighting equipment as the RLM standard dome and the bowl-enameled Mazda C lamp. All of the following group lighting designs are based on the RLM dome and bowl-enameled Mazda C lamp because this combination has been largely adopted by textile engineers, architects and illuminating engineers. Other lighting units, according to their efficiencies and distribution of light, will give an illumination slightly above or below the foot-candle values shown by the use of the RLM dome. All calculations of illumination are based on National Lamp Works Bulletin No. 41, "Illumination Design Data," and allowance made for depreciation.

FAVORABLE LIGHTING IN THE TWISTING ROOM.
Photo courtesy J. E. Sirrine Co.

Bale-Breaker, Opener, Picker Room.—The rough operations of breaking up the cotton as it comes from the bale, cleaning out the worst of the dirt, and lapping it into one sheet of fairly clean cotton, do not demand the same fine quality of illumination found desirable in other parts of the mill. Generally an illumination system designed for 4 to 6 foot-candles will be sufficient. It is the practice of some engineers to recommend the same quality and quantity of illumination in the breaker and picker room as in other rooms in order that the same general cheerful atmosphere might be maintained throughout the mill. Since the machines in these rooms are relatively few in comparison with the numbers found in the rest of the mill, there is hardly any set standard plan of machine grouping. Where there are many of these machines in one room such as is found in a few very large mills it is good practice to locate a row of units in each row between the ends of the machines. This insures that each end of each machine will be lighted. Probably an average spacing of the rows would be between 12 and 16 feet. Where the rows are 12 feet apart, the reflectors should be mounted at least 11 feet above the floor; where the rows are spaced on 16 foot centers, the reflectors should be 14 feet above the floor. In an ordinary picker room, the average illumination values which can be obtained by using the RLM dome and bowl-enameled Mazda C lamp on some of the ordinary spacing arrangements are as follows:



PICKER ROOM LIGHTING.
Photo courtesy J. E. Sirrine Co.



LIGHTING A FINISHING ROVING SECTION.
Photo courtesy J. E. Sirrine Co.

FOOT-CANDLES ILLUMINATION.

Reflector Spacing in Feet	150-watt	200-watt
12 x 12	5.5	8.0
12 x 14	5.0	7.0
12 x 16	4.0	6.0
14 x 14	4.0	6.0
14 x 16	..	5.5
16 x 16	..	4.5

Carding.—In the carding process where the individual cotton fibers are straightened and the finer dirt removed,

A WELL LIGHTED CLOTH ROOM IN A SOUTH CAROLINA MILL.

*Reprinted from a paper presented before the Boston Section Illuminating Engineering Society, October 18, 1921.

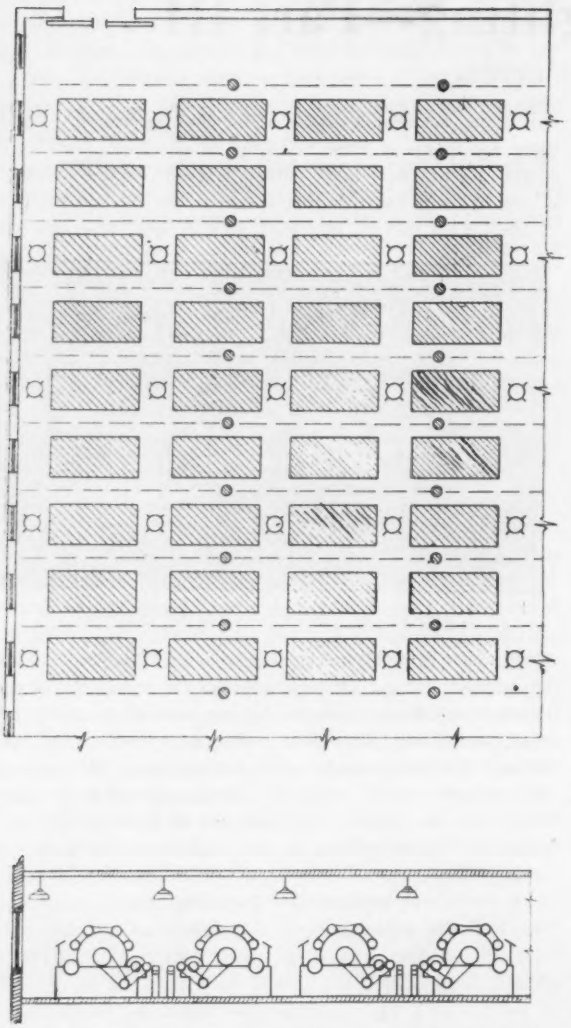


FIG. 1. A TYPICAL ARRANGEMENT OF CARD ROOM LIGHTING. THE FOOT-CANDLE VALVES SHOWN IN FIG. 2 APPLY HERE.

the visual requirements are slightly higher than in the preceeding processes. There are probably more potential accidents possible in the card room than on any other cotton machinery. For this reason, and for convenience in repairing the machines, the reflectors should be so spaced that there will be plenty of well diffused illumination between the machines. Every work aisle, including both the lap and the sliver delivery end of the card, and the aisles on the outside rows next to the walls, should have a row of lighting units in which the reflectors are spaced 12 to 16 feet apart. A sensible arrangement which can be adapted to the average mill is shown in Fig. 1.

Drawing, Slubbers.—The drawing frames which draw out the fibers of the cotton and make them parallel, and the slubbers on which these so-called slivers are wound up on bobbins, are ordinarily located between the carding section and the fine roving machines. The cotton has not as yet been reduced to a fine strand, and therefore does not require lighting of any better quality than that furnished for the carding. The machines are not very high and little trouble is experienced from shadows. It is common practice to extend the same spacing and reflectors used for carding to include the drawing frames and the slubbers. Sometimes the lighting used in the fine roving section is used for these machines. Either system will do.

FEET SPACING					
Along work aisles	Between work aisles containing rows of units	Square feet per outlet	Height above floor feet	Lamp watts per outlet	Foot candles average sustained
10	12½	125	12	100 150 200	4 + 7 10½
12	12½	150	12	100 150 200	3½ 6— 8½
14	12½	175	13	100 150 200	3— 5 7½
16	12½	200	14	150 200	4½ 6½

FIG. 2. THE AVERAGE FOOT-CANDLE VALUES RESULTING FROM DESIGNS SHOWN IN FIGS. 1, 3, 4, 5, 7 AND 8. THESE VALUES ARE BASED ON NATIONAL LAMP WORKS BULLETIN NO. 41, AND ALLOWANCES MADE FOR DEPRECIATION WHEN RLM DOMES AND BOWL-ENAMELED MAZDA C LAMPS ARE USED.

Roving (Intermediate, Fine Frame, Jack Frame.)—These machines are high and are commonly placed back to back forming a narrow back aisle, and face to face a work aisle. The lighting requirements are getting more and more exacting in these fine roving processes, since the cotton roving is being twisted and drawn smaller in each succeeding frame. The spindles are also increasing in speed. The usual practice is to provide good illumination in the work aisles, and make no extra provision for the back aisles. A good illumination for these machines is 5 to 7 foot-candles. A common arrangement of units is shown in Fig. 3.

(*Continued on page* 364.)

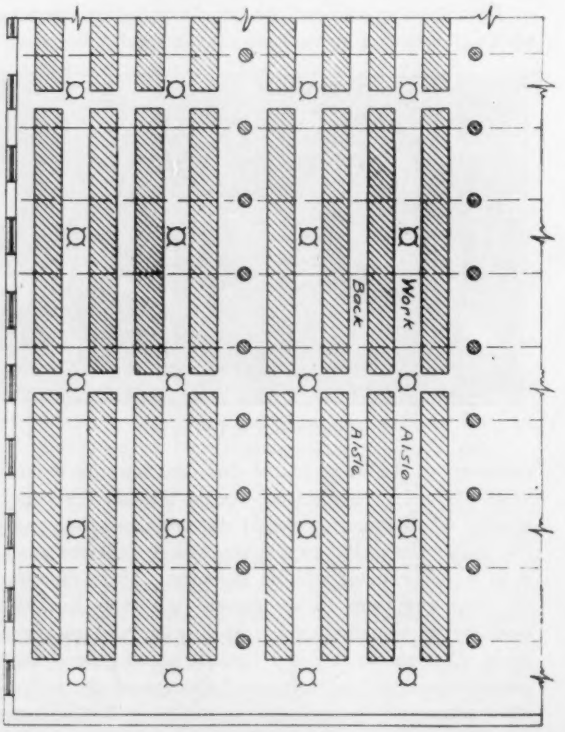


FIG. 3. A TYPICAL ARRANGEMENT OF LIGHTING UNITS FOR ROVING FRAMES.

What the Southern Mills are Doing

The Cash Cotton Mills, Gaffney, S. C., were bought from Dr. W. C. Hamrick, the receiver, on February 6, by C. M. Smith, president of the Merchants' & Planters' Bank, of Gaffney, for $300,000. It will be recalled that about a year ago an involuntary petition of bankruptcy was filed against the Cash Mills, capitalized at $500,000, by several of its creditors. Dr. Hamrick was named as receiver, but denied insolvency and applied for a trial by jury, and on October 2, special referees appointed by court recommended that the property be sold to avoid further expense, and the sale on February 6 was the subsequent result of an order directing the receiver to sell the mills.

Mr. Smith, who was the successful bidder for the mills, stated that he was acting as agent for Wilson & Bradbury, of New York City, and that this concern are the new owners of the mill. Dr. Hamrick, who acted as receiver for the property, will be executive officer of the mills, it is announced by Mr. Smith, and W. R. Tattersall, superintendent of the Limestone and Hamrick Mills, will be the superintendent. It is planned to have the new organization perfected and the machinery in operation as soon as possible. The mills have been renamed, it is stated, and will be known as the Aima Mills, for Dr. Hamrick's youngest daughter.

Another mill property which was sold at auction on February 6 was that of the Fidelity Manufacturing Company, at Charlotte, N. C. This property, however, was not offered as a whole, but the real estate, the machinery, etc., were offered separately. C. W. Johnston, head of the Highland Park Manufacturing Company of Charlotte, was the highest bidder for the real estate, which includes eleven acres of land, for $28,000; H. L. McCall bid in the carding, spinning and power machinery at $50,000; and C. A. Hamilton the weaving machinery at $10,000. The Fidelity mill, which was ordered sold by the court following the appointment of William Anderson as receiver some time ago, contains 8,500 spindles and 80 looms and has been manufacturing damasks. The building is of standard brick construction, and there are 17 operatives' houses on the 11 acres of land.

Report is to the effect that the Stonewall Cotton Mills, at Stonewall, Miss., will soon improve the plant extensively.

The Eatonton Cotton Mills, Eatonton, Ga., have announced that they will invest several thousand dollars in improving and enlarging their mill and property. The erection of a community house for operatives is planned, and consideration is also being given to the addition of considerable floor space to the manufacturing building. A Boy Scout club was recently organized at this mill, and other social features are being developed. A landscape specialist has been working on the grounds, and the sidewalks have been laid and the village houses are undergoing renovation.

The Hawthorn Spinning Company, of Clover, S. C., is erecting a two-story brick community building.

Pine Hall, N. C., it is reported, will have a new textile plant in the near future, to be known as the Pine Hall Manufacturing Company. The organization is incorporated with a capital of $25,000, and a number of leading citizens of Pine Hall and Spray are among the stockholders. Land for the plant has been purchased, and a number of sites have been secured for homes and a hotel and garage. Electric power will be developed from water falls. The nature of the product to be manufactured has not been announced.

Lawrence S. Holt & Sons, Burlington, N. C., contemplate the addition of a roller covering shop to the equipment of the Aurora Mills.

A warehouse is being constructed by the Cannon Manufacturing Co., at Kannapolis, N. C.

Contracts have been awarded on the new additions and improvements planned by the Vance Cotton Mills, at Salisbury, N. C. The new building will have 27,000 square feet of floor space, containing 200 looms and other machinery, driven by electric power. Lockwood, Greene & Company, Boston and Atlanta, are the engineers and architects.

An addition of 48 new looms is planned by the Caraleigh Mills Co., Raleigh, N. C.

Pee Dee Manufacturing Company, Rockingham, N. C., has let contract for the erection of a 60,000-gallon standpipe for fire protection and other purposes.

The sewage system of the Roberdel Manufacturing Company's No. 1 plant, Rockingham, N. C., has been completed, and work has been started on a system for the No. 2 mill.

Work on the spinning plant of the Highland Cordage Co., at Hickory, N. C., was begun on March 1, according to C. H. Geitner, director of the company in charge of building operations. The building will be 80x420 feet and will manufacture yarns. Plans are being made for the construction also of from 60 to 80 houses in the village. A warehouse 130x200 feet has already been erected.

It is reported that the Miller Cotton Mills, Waco, Tex., plan a 60 per cent addition to their plant.

The A. M. Smyre Manufacturing Company, at Ranlo, near Gastonia, N. C., which recently increased its capital stock from $400,000 to $1,000,000, will build a two-story, 300x125 foot, brick structure, and equip it with 15,000 spindles and other yarn manufacturing machinery. They also plan the construction of 100 new cottages for employees. R. C. Biberstein, of Charlotte, N. C., is the architect and engineer for the addition.

Plans are being prepared by J. E. Sirrine & Company, of Greenville, S. C., and Dallas, Texas, for a new 10,000-spindle cotton weaving mill to be erected at the new Alabama State Prison at Montgomery, Alabama.

Trenton Cotton Mills, Gastonia, N. C., will build an addition one story high, 50x105 feet, of modern mill construction.

The capacity of the plant of the Western Reserve Cotton Mills Georgia Company, at Quitman, Ga., will be doubled within the next 18 months, it was recently announced by D. M. Mason, treasurer of the company and vice-president and general manager of the Mason Tire & Rubber Company, which controls the Quitman mills. Another mill with the same capacity as the present plant will be constructed, which will double also the population of the mill village.

The Standard-Coosa-Thatcher Company, with headquarters in Chattanooga, Tenn., is headed by A. G. Thatcher, who was formerly president of the three companies

from which this organization was formed—the Standard Processing Company, the Thatcher Spinning Company and the Coosa Manufacturing Company. Other officers elected by the directors are: J. S. Verlenden, first vice-president; R. C. Thatcher, general manager; C. H. Miller, second vice-president; A. H. Thatcher, secretary; H. S. Thatcher, treasurer; P. F. O'Neill, superintendent Standard plant; R. P. Clark, superintendent Thatcher plant; and George P. Haslam, agent Coosa plant, at Piedmont, Ala.

It has been announced further that the Standard-Coosa-Thatcher Company will invest $2,134,125 at Piedmont, Ala., in a plant for the manufacture of cotton yarns and cloth. The present plant of the company at Piedmont, formerly known as the Coosa Manufacturing Company, contains 57,968 spindles for making combed yarns.

The New England Mill Situation.

Strikes against wage reductions in New England have caused a cessation of output in several large plants. They began a month ago when mills in Rhode Island announced a 20 per cent wage cut and a restoration of a 54-hour week. In Rhode Island alone, 35 mills were idle during the middle of the month. The Amoskeag and Nashua mills in New Hampshire were shut down. The Hamilton mills of Lowell were closed.

Reduction notices were posted in all the mills in Maine, and the operatives went to work as usual under the lower scale. In Maine, the mills declined to grant a 48-hour week three years ago and fought the matter out. They won and have operated on a 54-hour schedule but owing to the high costs of production they were unable to run in full. On some cloths orders were plentiful and satisfactory, notably on wide sheetings, pillow tubings, etc. But on many of the goods used in the manufacturing trades, southern mills undersold eastern mills and the wage change was the result.

In New Hampshire, a 48-hour week was granted to the operatives during war time to avoid strikes. The legislature did not pass a 48-hour law. When it became necessary to revise the wage scales downward this year, the managers of the New Hampshire mills decided to include the restoration of a 54-hour schedule in the announcement and this led to strike votes. Rather than have friction, it was decided by the Nashua and Amoskeag corporations to close their plants and await developments. There has been considerable union talk and some effort is being made to call a special session of the legislature to enact a 48-hour law. It is not thought that any such law will be passed in New Hampshire at present. In Vermont the wage cuts were accepted without question. This state operates on a 54-hour schedule. No trouble was met with in Connecticut where the 20 per cent cut and 54-hour week is acceptable.

In Massachusetts a 48-hour law has been on the statute books for some time. Efforts are now being made to repeal it but give little or no promise of success. Notices of wage reductions were posted in Fitchburg, Ware, Palmer, Chicopee, Lancaster, and Waltham, where there are gingham and colored goods mills. The reductions were accepted without question save in the case of the Boston Mfg. Co., at Waltham, Mass., where a strike of 200 weavers occurred. The employees of these mills were told that if the strike spread the mills would be closed. The strikers returned to work in a few days and accepted the new scale.

In Lowell, only two mills posted wage notices, one the Bay State, the other the Hamilton. When the operatives of the latter failed to appear for work it was decided to close the mills. The Bay State lost a few operatives but in a few days they went back. In Lawrence, the Pacific mills went on a four-day working schedule because of poor trade. No wage notices were posted in this city, nor in New Bedford or Fall River.

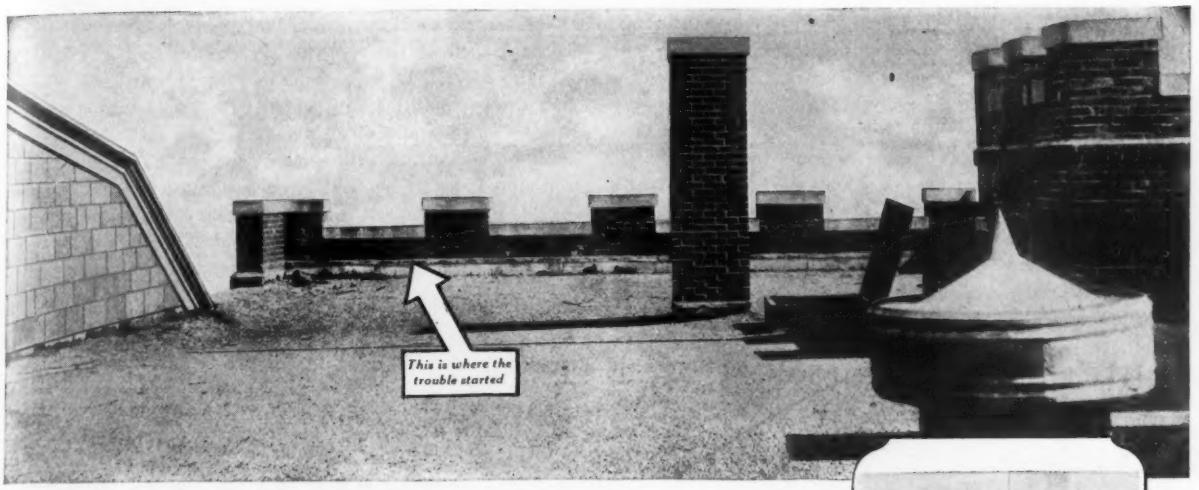
The Rhode Island situation was peculiar from the start. The B. B. & R. Knight mills posted notices and the Connecticut mills, having offices in Providence, R. I., did the same thing. The Connecticut workers accepted the reduction. The Rhode Island workers not only struck but became disorderly, especially in the Pawtuxet and Blackstone Valleys. Further north in the state, the Manville Company posted no notices, and some other cotton mills, like the Lorraine, engaged on fancy tissues, did not follow. For some time the spinning mills did not follow, but eventually they joined in. The consequence of the irregularity of action on the part of manufacturers in the same state was to precipitate a serious trouble that finally attracted the attention of the state authorities. After militia had been called out, government boards became busy and undertook to bring about conferences looking toward arbitration. At this time the strikes are still on.

The lack of unity among manufacturers in posting wage notices is the result of a series of differences arising among them concerning legislation and other things. Manufacturers outside of Fall River and New Bedford were ready to reduce wages last fall when the wage agreements were due to expire in the larger cities on December 1. Fall River and New Bedford manufacturers declined to take the lead in reductions and the manufacturers outside could not agree among themselves to put notices up and get a new scale established.

A policy of delay was followed until late in January and when the Connecticut and Rhode Island mills broke away most of the other manufacturers were disposed to wait and see what would happen. The decision of the Amoskeag Company to get down to a more reasonable basis of labor cost was precipitated in part by the naming of new prices on Fall cottons. Buyers would not order ahead at higher prices, except on the ginghams, and it became evident that the little business offering was going to be given to the mills that would and could meet the lower price levels demanded by the buyers.

To some extent, the long delay in enacting a tariff bill was a cause for disunity among the manufacturers. Some of the manufacturers closest to the state of things in Washington urged against any action toward cutting wages so long as manufacturers were asking higher protective duties. Others thought that the matter of politics, tariffs, or anything else, should not interfere with the handling of a proposition to put wages on a competitive basis. These men contended that operatives were not being fooled by tariff matters, while mills would certainly lose their markets unless something was done.

It is the first time in many years that the mill men have not acted in concert and it is unsafe to predict what may happen when common policies cannot be urged upon. It is certain that Fall River and New Bedford will not act



Don't Blame the Roof when Flashings Go Wrong!

Many a good roof is held responsible for leaks that are caused by faulty flashings.

An interesting case of such misplaced blame is that of the Barrett Specification Roof on the State Armory at St. Johnsbury, Vermont, laid in 1916.

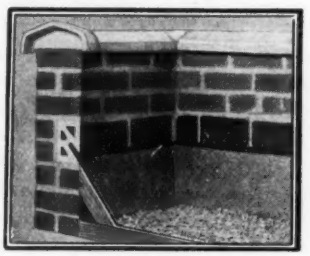
Some months ago, when the architect's plans for a new armory at Newport, Vermont, were submitted to the Adjutant General of the State, he refused to approve them because they called for a Barrett Specification Roof. In explanation of his refusal, he stated that the Barrett Specification Roof on the St. Johnsbury Armory had been leaking badly for several months.

The architect immediately investigated the trouble at St. Johnsbury. What he found there is shown by the illustrations. The roof itself was in perfect condition.

But the flashings, which were the usual metal type, were in sorry shape. All but two joints of the base-flashings had pulled apart and the counter-flashings in many places had broken away from the wall.

The settling of the building, and contraction and expansion due to changing temperatures, had made the flashings absolutely worthless. No wonder the "roof" leaked!

When these facts and the photographs were brought to his attention, the Adjutant General promptly approved a Barrett Specification Roof for the new Armory at Newport, Vt., but insisted that Barrett Flashings be used instead of metal.



The new Barrett Flashings. Note how slot in flashing-block takes care of expansion and contraction.

For permanent flat-roof buildings Barrett Specification Roofs are the choice of leading architects and engineers. This popularity is due to an enviable record for durability and economy. There are many roofs of this type that have been in service forty years or more and are still in good condition.

Close-up showing condition of metal flashings on St. Johnsbury Armory. No wonder the "roof" leaked!

Barrett Specification Roofs are moderate in first cost and are guaranteed *by a Surety Company Bond*, against all roof repair expense,—Type "AA" for 20 years; Type "A" for 10 years.

No more flashing troubles!

The new Barrett Flashings definitely solve the problem of permanent waterproof flashing construction. They are fully described in the Barrett Flashing Handbook and Flashing Service Sheets, copies of which will be sent to architects, engineers and contractors requesting same on business letterhead. Please address our nearest office.

The Barrett Company

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until it is settled whether operatives elsewhere will accept the lower scales.

Coincident with the wage troubles and the efforts to secure lower costs of production there have been some price reductions that have served to unsettle the markets. The fine count percales were revised in price some weeks ago. The jobbers asked that the low counts be revised. Finally the large corporation printers acceded to the jobbers' demands and reduced prices to a basis of 11¾ cents for 4-4 64-60s. Low end draper prices were also reduced. Soon afterward converters met the price on light grounds only. Western jobbers began to break prices to stimulate sales and at this time much price irregularity prevails.

It has been found impossible for mills to secure any large forward orders on competitive goods and on many non-competitive cloths there has been little or no business except for delivery within 30 to 60 days. In the fine goods field the disappointing volume of Spring business on wash fabrics has led to reports of stock accumulations, and while denials are made by manufacturers it is apparent that many goods were processed in advance of definite orders. A late Spring trade was expected and the belief now prevails that March will prove to be a very much better month than February.

Fall River has been a consistent seller of goods in the past few weeks and the demand for odd counts and narrow widths has favored sales of many goods that were moving slowly through the winter months. Yet the curtailment of production going on in that center is very considerable, several of the large mills running but four or five days a week. In New Bedford, the mills have been busy on specialties of many kinds and have not missed the business on the more staple goods until very recently. It is now stated that unless business quickens in March further curtailment will be seen in that center.

No one is able to say what the outcome will be in Fall River and New Bedford when wage reductions are attempted. The serious difficulty is the one of short hours and high taxes.

A 20 per cent reduction at New Bedford and Fall River will not of itself place mills there on a competitive basis. Massachusetts has hampered her mills by a 48-hour law and operatives have not yet been able to overcome this handicap in the way of increasing production. Some of the best regulated and equipped mills at Fall River are not within a competitive basis by 6 cents a pound on print cloths. It is claimed that a 33 per cent reduction would still leave mills there much handicapped.

The serious drawbacks are the high municipal and state taxes, the high freights, and the necessarily high rents operatives must pay when municipal and other taxation is on such a high level. Fall River mills are being taxed in many instances 6 per cent of their capital stock by the city and this does not include the taxes payable to the state and federal government.

One of the singular facts of the situation now is that help is more plentiful than it has been in years. Trade in silk mills has not been good and some of the yarn mills have been running to less than capacity. Many miscellaneous industries are inactive. The large wool goods mills are beginning to curtail, and so far as labor supply is concerned no basis for complaint exists.

The manufacturers of longest experience in wage troubles in the section say the last of the "bolshevik" war time spirit among the operatives is passing and it will not be long before the conditions are more settled. While operatives are still well provided with funds they are not disposed to dissipate them in long strikes.

In a private talk with some of the labor leaders it has been stated that if no fight is made against the short hour system any reasonable wage reduction will be accepted. For the time being, Fall River and New Bedford will watch other sections fight the matter out and then will probably reduce wages without friction.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, February 18, 1922.

Since our last review the market declined about two cents, which loss was recovered meanwhile, leaving prices at about the same level as they were one month ago.

Many developments of a constructive nature contributed to the improvement in the market, viz., the successful termination of the Washington disarmament conference, which was followed by a material advance in foreign exchange and a decidedly easier tendency of money, and a remarkable enhancement of farm products, which has brightened the business outlook, especially in the West and South.

Confidence in international affairs was made possible by the disarmament agreement reached by the allied nations, assuring peace for at least ten years, which is reflected in a growing optimistic feeling in London and Wall Street, as noted by the further reduction in the Bank of England discount rate from 5 per cent to 4½ per cent, and the London market rate is ruling at 3¼ per cent.

The political troubles in India have cost England so much in the loss of trade, the British, failing to bring about harmony by peaceful means, are about to resort to stern measures in an effort to restore order in India. Meanwhile Great Britain has offered Egypt, where political unrest has prevailed also, terms tantamount to independence, probably in order that the road to India may be opened for trade and military operations. As a result Manchester advices are more cheerful, cables reporting a better demand for goods from India and China, while the wool industry throughout the world is in a flourishing condition again.

The strike of mill operatives in Rhode Island and New Hampshire has failed to spread to the other mill centers of New England, and present indications are that differences will be adjusted in the near future. The strike had no appreciable effect on the cotton market.

The consumption of raw cotton by American mills continues large. Returns to the Census Bureau show that domestic consumption of lint cotton in the U. S. during January was 526,000 bales vs. 512,000 in December of this season and 366,000 for January of last year.

For the first six months of the season American mills have consumed 3,011,000 bales vs. only 2,337,000 for the corresponding period last season, while linters used amounted to 304,000 vs. 238,000 making in the aggregate 3,315,000 bales against 2,575,000 last season. It is evident, therefore, that the United States will consume between

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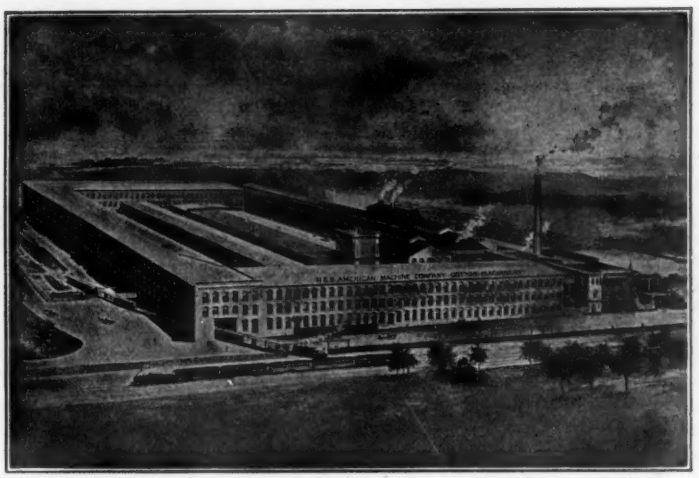
Card Room Machinery



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COTTON MACHINERY

6,500,000 and 7,000,000 bales this season vs. only 5,402,000 last season.

The South having marketed 8,096,000 bales to date, about all of last year's crop has come into sight, leaving only the surplus carried over in the interior at the close of last season, which was 4,690,000 bales, for spinners to draw from, so far as inland stocks are concerned. At this time last year the interior held 7,594,000 bales.

Furthermore, the world's visible supply of American cotton is down to 3,798,000 bales vs. 4,380,000 last year, of which stocks at U. S. ports are only 1,105,000 vs. 1,397,000 one year ago.

The world's visible of American is located today as follows:

	Bales this year	Bales last year.
Liverpool's stock	590,000	613,000
Manchester's stock	52,000	96,000
Continental stock	593,000	456,000
Afloat for Europe	305,000	403,000
U. S. Port stocks	1,105,000	1,397,000
Stocks at 30 interior towns	1,145,000	1,410,000
Exports February 10th	8,000	5,000
Total world's visible of Amer.	3,798,000	4,380,000

Therefore, cotton, present and prospective, appears to be in a very strong position, the supply being limited, making higher prices likely, especially if the demand becomes urgent, which is probable.

Preparations for the next crop are not being carried on with any enthusiasm owing to credit restrictions due to fear of the weevil. Sales of fertilizer are reported small to date. According to returns to the American Cotton Association sales of fertilizer in the cotton region so far are only 17 per cent of what they were to even date last year.

United Chemical Products Corporation, of Jersey City, N. J., manufacturers of chemicals, aniline dyes and dyestuffs, announce the addition of a representative to their selling force in the South. Charles Crawford, who was formerly connected with the offices of E. S. Tennent, purchasing agent, of Spartanburg, S. C., has become associated with this company as salesman, it is announced by R. T. Grant, the southern manager of the concern. Mr. Crawford's headquarters will be at the southern offices of the company in Charlotte.

Mr. Grant, the southern manager, recently returned from a trip to the factory at Jersey City, and reports that last year's business was one of the best in the history of the concern. He states that the company is increasing its sales force in the northern section as well as in the South, for the purpose of being better equipped to serve their customers.

The southern office of the company has recently been moved from 803 Realty Building, to 307 Commercial National Bank Building, Charlotte, N. C.

The Textile Division of the Gallaudet Aircraft Corporation, East Greenwich, R. I., are bringing out a new indestructible picker stick for use on looms. To those users who are familiar with Featherboards and Spur-Cap shells, the announcement of the addition of this new textile accessory to this company's line will be of interest.

Notes About Men You Know.

JAMES W. AHMUTY, superintendent of the Lynchburg Division of the Consolidated Textile Corporation, at Lynchburg, Va., died on February 2, after an illness of several months. Mr. Ahmuty was born in Blackstone, Mass., on June 28, 1871, and had been connected with some of the largest cotton mills in his native state and in Alabama, North Carolina and Virginia. He went to Lynchburg in 1916 with the Lynchburg Cotton Mills. He was a member of the Masonic order and of the Grace Memorial Episcopal Church, in which he was a vestryman, and always took an active part in the business, fraternal and religious life of the city. Besides his wife, he is survived by a sister, Mrs. James E. Dodge, and his father, James Ahmuty, both of Concord, N. H. Funeral services were conducted on Sunday, February 5, at the Grace Memorial Episcopal Church, following which the body was placed in the temporary vault at Spring Hill cemetery, until later in the spring, when interment will take place at his former home in New England.

JACK W. HORNER, who for many years has represented Ashworth Brothers, Inc., card clothing manufacturers, has become connected with Joseph Sykes Brothers, manufacturers of card clothing, etc., and will travel in the southeastern section for this concern. Walter B. Pratt, who recently succeeded Richard Thomas as southern representative for Joseph Sykes Brothers, will represent the company in the Carolina section, being assisted by Mr. Horner.

M. H. CARTER, for the past two years overseer of spinning at the Social Circle (Ga.) Cotton Mills, has resigned to become overseer of spinning at the Laurel (Miss.) Cotton Mills.

DEAN SUTCLIFFE, who has been superintendent of the Pomona Mills, at Greensboro, N. C., for the past four years, has recently resigned this position to go to Augusta, Ga., where, it is understood, he will become manager of four mills. On leaving Pomona, Mr. Sutcliffe was presented with a handsome gold watch, chain and scarf pin by his associates and employees of the mills.

M. C. PHILLIPS, who has been overseer of weaving, has been appointed superintendent of the Pomona Mills, at Greensboro, N. C., succeeding Mr. Sutcliffe.

H. A. NEWTON, who has been superintendent of the Hampton Mills Department of the Pacific Mills, at Columbia, S. C., under W. P. Hamrick, general superintendent, has been made superintendent of the Cocheco Department of the Pacific Mills, at Dover, N. H. In this position he succeeds John F. Minnick, whose resignation took effect on February 12.

C. T. FALLIN has been appointed overseer of the cloth room at the Edna Cotton Mills, Reidsville, N. C. He was formerly overseer of the Buffalo (S. C.) Mills, and for several years was in charge of the cloth room at the Fulton Bag & Cotton Mills, Atlanta, Ga.

B. W. BINGHAM has resigned as manager of the Ozark Cotton Mills, Ozark, Ala., to return to his former position as general superintendent of the Prendergast (Tenn.) Cotton Mills.

WILLIAM T. BRYAN, of Athens, Ga., one of the most prominent business men of that city and well known in textile manufacturing circles as a cotton manufacturer, died recently at a sanatorium in Battle Creek, Mich. Mr. Bryan was a native Georgian, born at Union Point on August 23, 1867. He resided in Athens the larger part of his life, and in the early nineties became connected with the cotton business in association with the late James Y. Carithers. Later, after associating himself with other industries of the city, he became interested in cotton manufacturing and organized the Southern Manufacturing Company. Some years later he reorganized the Jefferson Cotton Mills, at Jefferson, Ga., of which he was the president at the time of his death. In addition to his cotton manufacturing connections, Mr. Bryan was also connected with other institutions, being a director in the Southern Mutual Insurance Company, the Athens Railway and Electric Company and the National Bank of Athens, and was also an enthusiastic and prominent religious worker of his community, and was much interested in education and the youth of his city. The remains were brought back to Athens from Battle Creek for interment, which was held in the Oconee cemetery. Surviving Mr. Bryan are his mother, his wife and one son, three sisters and two brothers.

GEORGE DAVID SIMPKINS, SR., has become second hand in spooling and warping at the Fulton Bag & Cotton Mills No. 1, Atlanta, Ga.

GEORGE B. WEBER, JR., formerly motor sales engineer with the Westinghouse Electric & Manufacturing Co., has accepted a position as engineer with the Union-Buffalo Mills, Union, S. C. Mr. Weber is a graduate of the Alabama Polytechnic Institute.

J. W. SANDERS has become manager of the Montgomery (Ala.) Cotton Mills.

J. R. BRAGG has accepted the position as overseer of carding at the Lavonia Cotton Mills, Lavonia, Ga.

L. O. BUNTON, recently superintendent of the Standard Cotton Mills, at Monroe, N. C., has accepted a position with the weaving department of the Cannon Manufacturing Co., at Kannapolis, N. C.

J. A. THOMPSON has been made overseer of spinning at the Bradley Manufacturing Co., Columbus, Ga. Mr. Thompson, who succeeds S. W. McLain in this position, has been overseer of spinning, spooling, warping and twisting at the Fulton Bag & Cotton Mills, Atlanta, Ga.

O. N. STARR, president of the Echota Cotton Mills, Calhoun, Ga., died at his home there recently.

J. B. PARKER has resigned as superintendent of the Bibb Mill No. 2, Macon, Ga., to accept a position with the Maginnis Cotton Mills, New Orleans, La.

JOHN HAMPTON has been promoted from second hand to overseer of spinning at the Fairfax (Ala.) Mills. M. M. Benton has been transferred from overseer of day spinning to night superintendent at the same plant.

C. G. HILL, who has been secretary and treasurer of the Amazon Mills, Thomasville, N. C., has been elected president and treasurer of the mill to succeed the late J. W. Cannon. Robert C. Rapp has been made secretary to succeed Mr. Hill in this position. C. A. Cannon was re-elected vice-president.

CHARLES ICEMAN has resigned as general manager of

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the Marlboro Mills, McColl, S. C., and will devote his time to the management of the Iceman Knitting Mills, at Monroe, N. C.

HENRY HARDING TIFT, prominent southern business man and philanthropist, died at his home in Tifton, Ga., on Saturday morning, February 4, following a short critical illness. Mr. Tift was a native New Englander, born in Mystic, Conn., on March 16, 1841, and belonged to an old New England family. After schooling in New England, he came South to Albany, Ga., and was connected in the saw mill business with his uncle, becoming general manager of the Tift Manufacturing Company at Albany in 1870. In 1872 he located a saw mill on the Brunswick and Albany railroad (now the Atlantic Coast Line), at a point that was later named Tifton for him. Enlarging his interests from the lumber business, in which he was a pioneer, Mr. Tift later organized the Bank of Tifton, of which he was president, and continued to expand his business connections until at the time of his death he occupied the following positions: president, Tifton Cotton Mills and the Piedmont Cotton Mills and the Bank of Tifton; vice-president of the Central Grocery Company and Tifton Compress Company, the Bankers' Trust Company, and the Willingham-Tift Lumber Company of Atlanta; a director in the Georgia, Southern & Florida railroad; and president of the Tift Silica Brick and Stone Company, of Albany. He was president of the Georgia-Florida Saw Mill Association for many years.

Mr. Tift was perhaps best known for his beneficient donations to the cause of education, and was also largely interested in civic welfare and improvement. He made large donations to Bessie Tift College, at Forsyth, Ga., which was named in honor of Mrs. Tift, and by his generosity secured the location of the Second District Agricultural School at Tifton, and by means and influence contributed largely to its operation. He is survived by three sons, H. H. Tift, Jr., and Amos Tift, of Tifton, Ga., and T. W. Tift, of Atlanta, and two brothers-in-law, W. B. and Baynard Willingham, both of Atlanta. It is understood that T. W. Tift will assume his father's direction of the Piedmont Cotton Mills and the Tifton Cotton Mills.

W. W. POOLE, secretary of the Henrietta Mills, Henrietta and Caroleen, N. C., died at his home in Caroleen recently. Funeral services were held at Caroleen, after which the remains were taken to Charlotte for interment. Mr. Poole had been connected with these mills for a number of years and had made an enviable record as a manufacturer. He was well and favorably known in southern mill circles.

GEO. W. DEARBORN, for a number of years agent of the Bay State Cotton Corporation, Lowell, Mass., has resigned his position, his resignation taking effect Feb. 1. He will remain with the company in an advisory and consulting capacity.

HUGHES L. SIEVER, representing the Borne, Scrymser Company, 80 South Street, New York City, recently made his second trip through the South, introducing the Breton Minerol products of this company, and calling on the knitting mills and other textile plants operating dyeing and finishing plants. It will be remembered that Mr. Siever made his first tour of this section last October, being the first representative to make a personal introduction of these products. He stated that he was very much pleased at the reception accorded him and Breton S and Breton Minerol F. He was accompanied by Mrs. Siever on this trip.

C. A. CANNON, of Concord, N. C., has been elected president of the Tuscarora Cotton Mills, Mt. Pleasant, N. C., to succeed his father, the late James W. Cannon.

G. F. JOLLY is the new cloth room overseer at the Adams Cotton Mills, Macon, Ga.

W. F. O'PRY has been made general superintendent of the Crawford (Ga.) Cotton Mills.

W. W. MOORE, who about six months ago retired as superintendent of the Riverside Division of the Riverside and Dan River Cotton Mills, Danville, Va., died at his home in Danville on Sunday, January 22. He had been in ill health for the past two years and for the last six months had been failing rapidly. He was 55 years of age and is survived by his widow and three sons, Robert, Clifford, and W. W. Moore, Jr.

A. L. DEANE has become superintendent of the Imperial Cotton Mills, which is erecting a new 12,000-spindle plant at Los Angeles, California. Mr. Deane has been superintendent of the Denison (Texas) Cotton Mills, but was previously connected with the Bibb Manufacturing Co., of Macon and Columbus, Ga.

JOHN G. LESLIE, of New York, has been elected president of the Wiscasset Mills, Albemarle, N. C., succeeding the late J. W. Cannon.

J. S. EFIRD has been elected president of the Efird Manufacturing Co., Efird, N. C., to succeed the late J. W. Cannon. Mr. Efird was formerly secretary, and is succeeded in this position by H. L. Horton.

W. F. MCSWAIN has been promoted from overseer of spinning to assistant superintendent at night at the Grace Cotton Mills, Rutherfordton, N. C.

J. B. MOORE has resigned as assistant superintendent of the Grace Cotton Mills, Rutherfordton, N. C., to become superintendent of the Lockmore Cotton Mills, York, S. C., succeeding Fred C. Wood.

R. W. LEWIS, formerly superintendent of the Jackson Mills, Iva, S. C., has accepted the superintendency of the Martinsville Cotton Mills, Martinsville, Va., succeeding J. E. Finlayson, resigned.

B. F. O'NEAL has been promoted from assistant superintendent at night to assistant superintendent of the Grace Cotton Mills, Rutherfordton, N. C.

C. B. HUNT, manager of sales promotion of Wadsworth, Howland & Company, 139 Federal Street, Boston, Mass., recently made his regular semi-annual visit to this section representing his company. On this trip Mr. Hunt devoted a large part of his efforts toward the introducing of a new show card color proposition, but still kept in touch with his friends in the textile industry.

ROBERT C. BOGER, president of Boger & Crawford, Philadelphia, suffered a fracture of both legs and other painful injuries, when struck by an automobile on a street in Gastonia, N. C., on February 16. Mr. Boger was on this way to Lincolnton, where his company operates a spinning plant, and had stopped off at Gastonia when the accident occurred. He was taken to the City Hospital in Gastonia.

HENRY W. SALMON, assistant treasurer of the Whittier Mills Company, Chattahoochee, Ga., died suddenly at his home on Monday night, February 27th.

AN OLD TIMER SAYS

I take it for a psychological fact that practically all men like to read detective stories.

Now I never wrote a detective story, but I have written so darn much about textile machinery, textile calculations and things pertaining to textiles that I want to take a rest and write about something else, and perhaps the other readers of COTTON would also like a little diversion.

But, being born and reared, so to speak, in the mill, I know I am not competent of writing about anything but mill work, so with this explanation the reader need not expect a detective story or anything else, except to hear an old mill man talk out of his head. We will excuse you from reading further unless your curiosity is aroused enough for you to run on down through these lines to see if anything may happen to be said that would fit your case.

All detectives must have a case to work on, and taking up *your* case in particular, I just want to ask you one question and I want COTTON to print that question in bold faced type and give it space enough so that you can cut it out and paste it in your hat. I want you to be sure to see it every time you crown your head.

This question is such a vital one in your case, and as it is intended especially for you, the reader of these lines, I want to ask you to promise to not answer the question for at least two weeks. Then some night, after the wife and kids are all gone to "Nappy's town," sit down and write COTTON frankly, honestly and in your own way of talking, the answer to the most important question you have ever been asked in your life.

Now don't try any tricks on an old timer, because some of my bitterest enemies have said that I can tell pretty well when a man is enlarging on the truth. And I am going to watch COTTON for every answer, because I am interested in every ambitious mill man, and if you will answer this question just the way you feel about it, and give all the reasons, whys and wherefores, it will give, not only myself, but the many mill officials, the editors, and others a pretty fair idea whether you think you are made out of the right kind of material or not.

You would be surprised to know the number of men who are looking for other men for some special job and oftentimes the most casual remark will be the direct cause of a man being offered promotion. I have known of quite a few men who thought they were "big guns" until they "got fired."

It will do you good to really know yourself. Very few men actually *know themselves* as well as they know some other men.

This question I am going to ask you has been given much thought, it has been boiled down, criticized and analyzed, until it contains only seven words. But, golly! they are some big words—not in number of letters, but in importance in giving you an insight into yourself. And after all, *yourself* is the most important thing to you in the world. It is your greatest asset. It matters not how much money or religion you have, "yourself" is the most important thing to your dear wife and kiddies, the most important thing to your employer, more valuable than the most costly machine or group of machines in the mill.

Employers are fast beginning to realize that *men* are hard to find. There is always somebody ready to "fill" a job, but how? Does your employer believe he has in *you* the most valuable man he could find for your job? He should. If not, whose fault is it? I am getting pretty close to that question; just be patient, I'll give it to you in a moment. I want you to be prepared to realize its full meaning. Yes, I know you will smile when you first read it, but after you smile then give it an honest-to-goodness, fair, serious thought. But please don't attempt to answer it for at least two weeks—merely keep saying the seven words over and over to yourself every time you put on your hat. I'm not joking, I really mean for you to paste the question in your hat. If you will, you will soon find out what it will be worth to you.

No man can keep this question constantly before him without running his job better. And if you continue to run your job better and better, promotion is just as sure to come as taxes. Here is the question:

Would You Hire Yourself for Your Job?

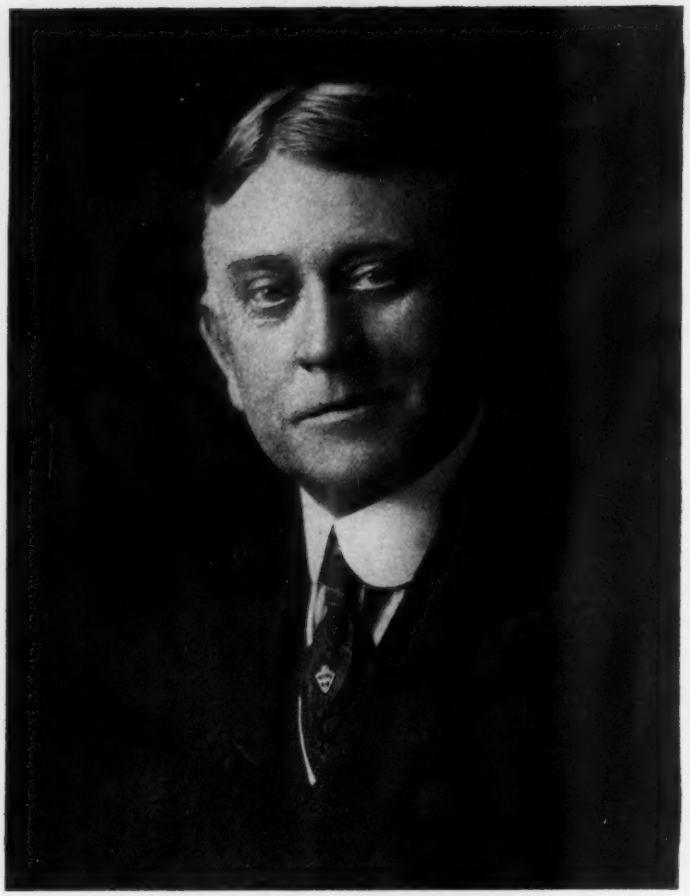
Having those seven words constantly in my mind has caused me to roll out of bed many a cold morning when the first whistle blew instead of waiting for the second whistle which would just give me leeway to get to the mill on time.

They have caused me many a time to get up from where I had sat down to rest and go hunt for something to do.

They have caused me to do my very best to save a few dollars or a few cents on supplies. Those seven words have been the cause of my getting more production than my competitors. Mr. Superintendent, Mr. Overseer, do you realize you have got competitors?

Ask yourself the question persistently for two weeks. Then, if you are not able to answer it with a clear conscience, keep asking it, and you will continue to grow.

The most successful overseer or superintendent is the man who can profit most by the experiences of other overseers and superintendents.



ROME C. STEPHENSON

PRESIDENT, ST. JOSEPH LOAN AND TRUST COMPANY, SOUTH BEND, IND.
FORMER PRESIDENT, SAVINGS BANK SECTION OF THE AMERICAN BANKERS' ASSOCIATION

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The complete audit offers a two-fold advantage. It provides the business man with definite facts and figures concerning his affairs and it removes the temptation to appraise conditions with undue optimism. At the same time the complete audit strengthens the banker's judgment in determining the actual condition of the borrower's business, and thus contributes in a substantial way to the development of exact information upon which all prosperous business is founded.

Rome C Stephenson

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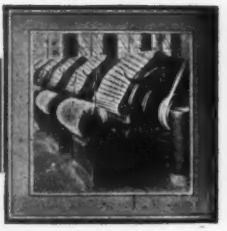
How Other Men Manage

Practical Discussions by Cotton's Readers on all varieties of Mill Subjects



Static Electricity.

EDITOR COTTON:

It takes some nerve to start out to write about a subject and yet admit in the very beginning that you don't know anything about it. Still, when I confess to an ignorance concerning the sort of electricity that gives us trouble in the manufacture of cotton, I do not believe that I am in a class by myself.

It is undoubtedly a subject of some importance. You will hardly find a mill man who hasn't been up against it good and hard more than once, and yet I have never heard it discussed in any meeting of mill men, nor have I ever seen more than one or two articles in any of the trade magazines that more than barely touched the subject, and I believe that most of the silence can be laid to downright ignorance and nothing else.

So I am writing this, not with the expectation of imparting any particular information, because I do not know anything about it, but in the hope that some of the readers of COTTON will be induced to open up and give us the benefit of their knowledge and experience.

Text books will tell you very little. The sum of what I have been able to learn from that source is about as follows:

(1) Static or frictional electricity is generated by friction between two bodies. These bodies may be almost anything from a stick of sealing wax and a silk handkerchief to a leather belt and a steel pulley, or cotton fibers both before and after weaving and the moving parts of almost any machine it may go through in process of manufacture.

(2) The more speed, the more electricity. I remember a master mechanic who didn't want to fix a humidifier and who took out his spite by saying "they ran cotton mills a hundred years without these dam things, and since some Yankee invented one they can't do without them." He was right. Until high speed machinery came into use, troubles with electricity such as we have today were unknown, and looking into the future it would seem that with the increase of speed which seems inevitable, these troubles will increase unless prevented by some means more satisfactory than those we have at present.

(3) Frictional electricity is presumably induced by a dry atmosphere and disappears in the presence of water or oil. For this reason it is considered necessary to install some sort of apparatus to introduce moisture into the air of a cotton mill so that the stock will be kept properly moist and will work into yarn in the most satisfactory manner. It is pretty well proven that yarn spun under a proper degree of humidity is more even and stronger than yarn spun with too little or too much, and practically all mills have some sort of humidifying system, more or less unsatisfactory and expensive. And yet I know of at least one mill which has never had a humidifier of any sort and never will under the present management, and while I have never been in the mill I have been told that it runs all right winter and summer.

So there you are. One man says this about electricity and tells us just what to do to get rid of it, another man says "no such thing" and tells us something else and both apparently prove their point.

About the middle of last October we began to have trouble with electricity in the card room. When the carder first began to grumble nobody paid any particular attention to him, thinking it would last a day or two and go off as it generally does, but instead of getting better, it got worse. The bleached cotton had spells of a day at a time when it refused to go from the doffer to the trumpet. Out of a dozen or so cards there would be three or four ends down at a time with a couple of hands trying to keep them going. This meant a big box of waste every hour or so. Once through the cards, the bleach generally ran all right on the drawing, but with the colors it was the other way around. They generally did very well on the cards and refused to behave on the drawing. Nor was it always one particular color or the same color two days in succession, so it couldn't have been the dyestuff. Sometimes the light shade of a particular dye would have electricity, sometimes the dark, but hardly ever the two shades at the same time. We ran 800 pounds of yellow which was dyed with a direct dye and should have given no trouble at all. For the first day and a half after we put it on the cards it ran as well as could be desired, then it suddenly took a notion it didn't want to be made into sliver. I tried five minutes to put up the end on a card and never got the web four inches from the doffer. The card sliver we had already run on this color, although it had given no trouble on the cards when it went through, now decided it didn't like the looks of the coiler head on the draw frame, and rather than go through that little hole would prefer to come out sideways and choke up under the rolls. If it got into the roving can it would not lie down, but stand up around the sides.

Same way with the light brown. We had to take them both back to the dye house and wash them over before they

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

would run. Other colors would run with the greatest enthusiasm a day or two and then change their minds. To sum up the whole matter, we had as bad a case of electricity as I ever saw and it stayed with us about a month. Naturally it made very bad work all the way through the mill and some of the filling was a caution.

In the meantime we exhausted our imagination trying to account for it. First we said it was humidity, or the lack of it, but during the whole time the card room hygrometers showed from 60 to 70 per cent which certainly should have been enough, and wet and dry days had no effect so far as we could see. During this argument it came out that this card room was at one time robbed of all its humidifiers to supply the weave room and ran about a year without any humidifiers at all and without any particular trouble from electricity, certainly without as much as we were having at that time.

Then somebody suggested that the cotton was too fresh from the dryer; hadn't aged enough. So we went out into the warehouse and got some that had been out there a couple of weeks and it ran just as badly, maybe worse.

Then somebody began to talk about putting a little softener in the wash water after the cotton had been dyed, but as we already had about a thousand pounds of raw stock we couldn't spin as a result of a similar experiment, we didn't try that any more. I might remark in passing for the benefit of those who have never tried it, that putting softener into a raw stock dye bath or using it in the wash water after it is dyed is the best method I know of to fix it so it will not run. Salesmen will recommend it sometimes, and I have used it up to four or five pounds to the 600 pound batch without doing any particular damage so far as I could see. It sounds reasonable to say that it replaces the natural oil of the cotton which has been removed in dyeing or bleaching, and maybe it does, but if a mill man goes much above that proportion he might just as well give the cotton to a mattress factory, for he will never spin it.

When the bleach first began to show signs of electricity we tried to get rid of it by steam jets behind the cards. It seemed as if this would certainly put enough moisture in the cotton, but I have seen a line of cards completely stopped from electricity with steam jets blowing between the cards all the time, and I have often thought that the steam jets rushing out of the pipes might possibly generate a good deal of electricity, instead of destroying it. Incidentally, this is one of the best methods for the encouragement of card clothing salesmen.

Then we put hot water on the floor and about the time we began to see some benefit from it, the cloth room overseer came up and said we were spoiling a stock of cloth in the cloth room which was directly underneath. Then we gave a man a bucket of kerosene oil and a piece of waste and instructed him to walk behind the cards and throw a little oil on the laps occasionally. This will take the electricity out of a card for a while, but it has to be done over every few minutes and is another very good method for making a card clothing drummer feel that all is right with the world.

On the draw frames the first thing we did was to put spirits of ammonia in the coiler head. This helped some and we also tried alcohol, gasoline, hot water and anything else that would evaporate, but couldn't see that one was any better than another. In the coiler hole we tried everything slick we could find, from talcum powder to graphite. We even tied a wire from a draw frame over to a water pipe with the idea of leading off some of the electricity. We tried everything anybody could suggest and all of them helped some and none of them stopped it.

The whole business finally got so bad it looked as if the mill would stop. Then we did what we should have done in the first place—we went back to the dyehouse. The dyer had been saying all along that he had not changed anything, but in talking things over we argued that if we could take back a batch of cotton that would not run and wash it over so that it would run all right, it might be that we were not washing it enough when we dyed it. This helped him to remember that about the time our trouble started he had increased the wash. There is a water pipe rigged up over the hydro-extractor in such a way as to run water into the cotton as it is being whizzed, and this arrangement had always been used to wash out the heavily dyed stock around the sides and along the bottom of the raw stock machine. About that time, however, the dyer had commenced giving all the batch that treatment, and we decided to stop it with the idea that it washed it too much. In the last wash water before the cotton is taken out of the dyeing machine we always run a good deal of salt. If this salt is left on the fiber, its hydroscopic action draws water from the air and thus keeps the cotton sufficiently moist to work well. By washing too much in the extractor we argued that we had washed the salt out again, so we went back to our former method.

It also developed that on account of the carder kicking about the stock coming from the dyehouse too wet, the dyer had slowed down the dryer, so we speeded it up to what it was running at before. We thought that the work would go better if it were not so bone dry to start with, and our idea was right. These two things, combined with keeping the opener room doors closed and humidifiers going all the time in both the opener room and the picker room cured our troubles completely.

I have related this somewhat fully for the benefit of those who have never been through such an experience, which I suppose are few, and for the amusement of those who have, which are many, and I would now like to have some of the old hands at this game answer a few questions.

1. Is there any literature on this subject which treats of it in a thorough and reliable manner? In other words, how much do we really know about this static electricity, if anything?

2. Will the rush of steam out through a nozzle generate such electricity? I think it will, and am pretty sure it has been done experimentally. If so, am I not right in thinking that sometimes, under the right conditions, a steam jet will do more harm than good?

3. Why does ammonia placed in the coiler head of a draw frame overcome electricity in the stock as it goes through? My guess is that being volatile it moistens the fibers. If this is true, will not almost any volatile liquid do as well, and is there anything that will accomplish the purpose better?

4. Is this electricity of a kind that can be led away by a wire properly placed or influenced in any way by outside conditions, such as being induced in a machine by a counter belt running above it? Is it inherent in the cot-

TEXTILE BANKING COMPANY

FACTORS

FIFTY UNION SQUARE

NEW YORK

ton itself under certain conditions of the fiber, or can it be caused by the electrical condition of surrounding objects?

5. Does anyone know of any methods of overcoming electricity on cards, drawing, etc., better than the ones we used? If so, let's hear them.

6. Why should electricity affect the cotton on different machines? Why should one color give trouble on the cards, but run all right on the drawing, while another will run perfectly on the cards but refuse to run on the drawing?

When you begin to ask such questions most mill men will look at you as if they think you are foolish or else they will look foolish themselves and mumble something in their beards about "happen-so," but I think it is time we looked this electricity stuff in the eye and got rid of it. Let's hear from somebody who knows.

H. J. (Ala.)

What is thought to be the first catalog ever issued on steel office and factory partitions exclusively has just been published by the Sanymetal Products Company, 986 East 64th Street, Cleveland, Ohio. This company is well known in the metal toilet partition field, but began expanding its line about two years ago to take care of a widely increasing demand for metal partitions for offices and plants. The new catalog is attractively illustrated with a number of Sanymetal installations. Many of the adaptations of the company's products should prove of interest to cotton mill owners. The catalog can be obtained by writing to the manufacturers.

Streaky Warp and Shady Filling.

EDITOR COTTON:

I am forwarding you two pieces of gray cloth, which you will notice is streaky in the warp and shady in the filling. We have had much trouble with this difficulty, but at intervals. The roving is supposed to be of the same shade, but there is cotton going through at times that has a shade of the sample, and when the shady is not in the single filling it is in the plyed warp or filling of about the same numbers which is made in another part of the yard from where the single filling is made. I should very much appreciate having any information as to the solution of my problem. W. W. S. (N. H.)

[NOTE—This question has been answered direct by the Editorial Department, but if any readers have a suggestion to make concerning the matter, such suggestions will be appreciated.—Editor.]

Another Spooler Tension Device.

EDITOR COTTON:

Among the many patented devices for applying tension to the yarn on the spoolers is another ball and socket device originated by two New Bedford (Mass.) mill men, both department heads at the Booth Mill. This device is different from most others in that it is automatically self-threading and self-cleaning. It is simple in construction and has been running very successfully in the Booth Mill for the past four months and has proved itself to be practical and efficient.

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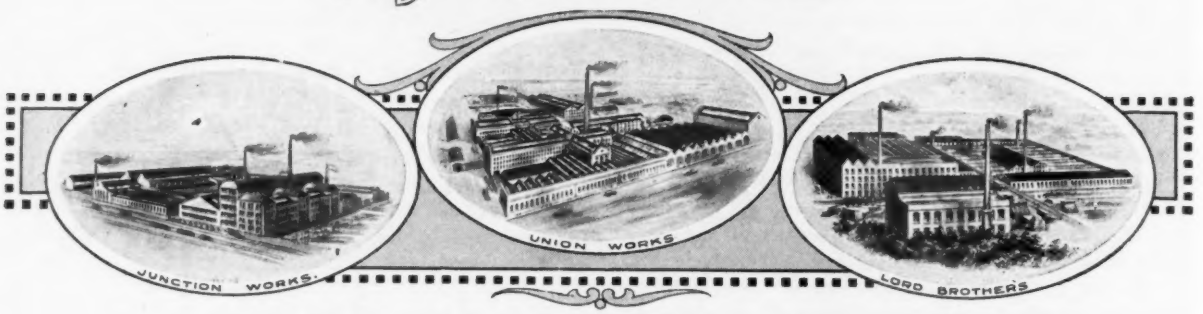

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Mixing, Opening, Carding, Preparing, Spinning, Winding, and Doubling Machinery for Cotton; Machinery for Waste Opening, Carding, and Spinning on Various Systems; Self-acting Mules and Cheese Winders for Wool.

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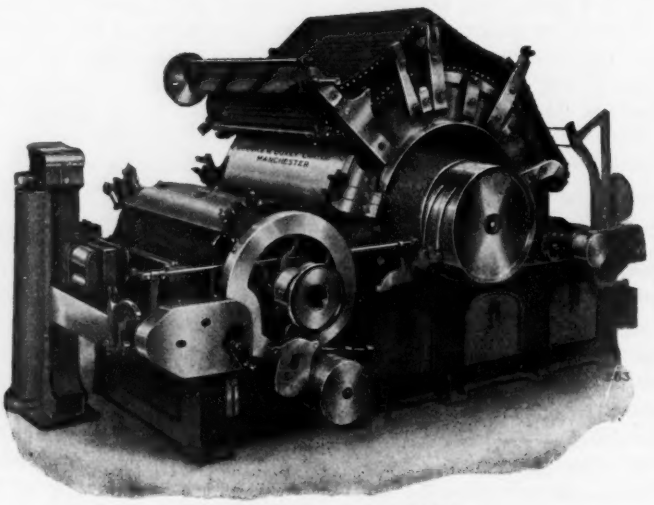

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Constructed to give the maximum rigidity necessary for accurate setting and perfect running. Facings, joints, pedestals and brackets steady-pinned in position where necessary, obviating re-adjustment after being set to work. The tendency of ordinary keys to slip off their flats when subjected to the strain of starting is overcome by keying on all pulleys and most wheels by patent semi-circular keys recessed in the shafts.

Patent Splicing Machine for the "Knotless" Yarn trade; Roving Waste Openers; Thread Extractors and Spinning and Doubling Frames for Silk.

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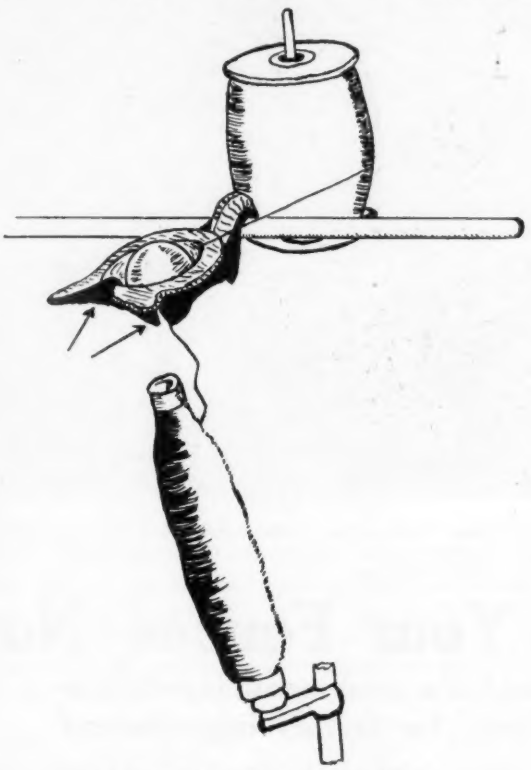
HEAD OFFICE:- UNION IRON WORKS, WEST GORTON, MANCHESTER, ENG.

INCORPORATING LORD BROS. TODMORDEN.

The part of the mechanism which applies the tension to the yarn consists of a smooth metal ball of varying size according to the size of the yarn and the amount of tension needed. The ball fits in a conical socket which is open at the bottom and has a vertical slit down the side. There are guides converging on this slit for the purpose of threading. The yarn passes through the opening at the bottom of the ball receptacle and up one side and out over the top onto the spool. The metal ball rests against the yarn at some point during its passage through the conical receptacle, and applies the tension without any scraping



ANOTHER BALL TENSION DEVICE.

action that might take the nap from the yarn. Dirt or lint fall out at the bottom of the conical piece without impeding the tension action in the least.

This device is different from most others in that the inventors have succeeded in overcoming the kinking of the yarn. This problem has been solved by a stub rail which has been hung from the traveling rail of the spooler and on this stub rail there are placed pins to hold filling wound bobbins or cradles to hold warp wound quills. The tension device is fixed to the traveling rail of the spooler so that in action both the device and the yarn that is being unwound travel up and down but are always in exactly the same relationship to one another, the distance being unchangeable.

This device weighs less than a quarter of a pound and it has been found that the traveling rail is able to carry the weight of both the tension device and the bobbins with no special adjustment of the spooler.

There are five different sized balls necessary to the equipment of each device to give it a range from 8s to 120s yarn. The largest ball being suitable for anything up to 30s; the next largest from 30s to 50s; the third for 50s to 70s; and the fourth for 70s to 90s; the smallest is for anything finer than 90s and up to 120s.

The self-threading feature has proved to be popular with the operatives as there are no eyes to thread and nothing whatever to do after piecing up the broken end except to place the yarn against the guide which automatically carries in into the tension cup. W. A. K. (Mass.)

Replies to "E. H." on Breaking Strength.

EDITOR COTTON:

With reference to the letter of "E. H. (Mass.)" in the January number, stating that he wants to increase the breaking strength of his yarn, it might be that, in an effort to locate his difficulty, a "lucky shot in the dark" by someone will point to the particular process or condition of things wherein lies the source of his trouble. However, as a loss from "standard" in breaking strength can be traced to each process in turn, even going all the way back to the raw material itself and then on to the spinning frame, unless one were "on the spot," it might be impossible to locate the difficulty.

My suggestion to "E. H." is this: Start with the raw material and see that the cotton is of good body, character and of even staple (1 inch in length in this case), grading average Strict Low Middling to Low Middling. Allow no bales of a weak character, or those containing a large percentage of "lint"—cotton that breaks too easily when "stapled" and is composed mostly of wasty, short fibers—and use no waste except the usual roving and drawing waste. If absolutely necessary to use several such bales in a "mix" he should do this in the ratio of 1 to 10 of good cotton. He should use as many different "marks" as convenient, never less than ten, whether he mixes in mixing bins or spreads the cotton around the bale breaker.

The cotton samples should be "gone over" by a competent cotton man, when the cotton is purchased and again when it arrives at the mill; redrawn samples should be looked at and checked with the original samples, thus making sure that the mill is getting what was bought. All bales not up to "grade and staple" should be rejected.

So much for the most important part of all—the raw material. Unless the raw material is of good quality, then "E. H." or any other mill man may scheme and try and try again, but he will not get what he is after, in this case a proximity to the standard break.

Assuming that the raw material is of good quality and properly mixed, let's have a look at the pickers. The speeds of the beater, fan and feed roll should be checked up. The speed of the beaters should be 1,200 r.p.m. for two-blade, 800 for three-blade, and 700 for Kirschner. The fan speed should not be over 1,000 r.p.m. unless absolutely necessary to properly throw the stock onto the screen. The blows per inch should average 40 on the finishers, 35 on the intermediates and 25 on the breakers and openers. Then let us proceed as follows:

See that the screens and cages and selvage leathers are in good condition. Set the feed rolls at 3/16 of an inch from the beaters and the grid bars 3/16 of an inch apart. Weigh every third lap from the finishers and allow no variation greater than ½ pound each way from standard. Re-run all laps heavier or lighter than this.

With all these points correct, having made the necessary adjustments of the feed, fan and beater speeds, and having secured the proper settings on the feed rolls, grid

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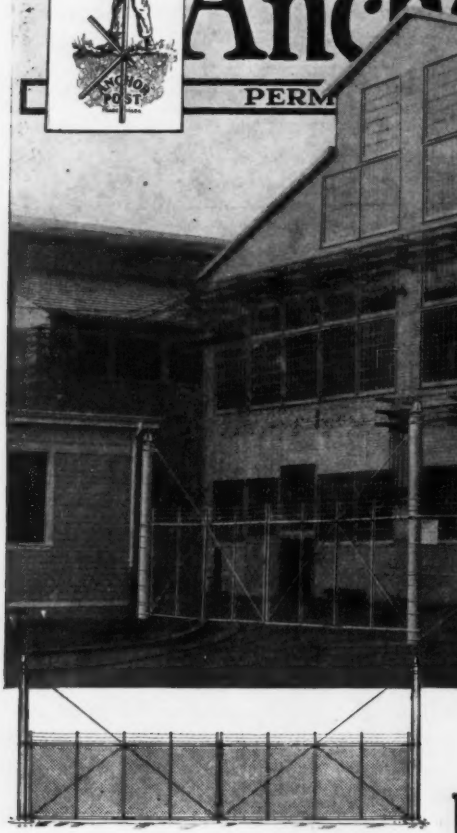

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PERMANENT — BECAUSE THEY ARE GALVANIZED

bars, etc., we can now go ahead feeling that the pickers are o k.

In looking over "E. H's." doubling and drafting information I can find nothing radically wrong and would not suggest any changes, except that it might be a good plan to make a 5.00 hank roving in place of the 5.50 hank now being made, with slight change of draft on the slubber and intermediates to compensate for same, all of which will be dealt with later. Now let us pass on to the cards.

I would suggest that the average speed of the card cylinders be 160 r.p.m., with a 400-r.p.m. speed for the licker-in, and from 10 to 12 r.p.m. for the doffer, preferably 10 if this will adequately care for production needs. For the card settings I would suggest the following: licker-in to cylinder, 10 gauge; feed plate to licker-in, 10 gauge; bottom knife, 10 gauge; top knife, 12 gauge; screen, 34 gauge; doffer, 5 or tight 7; comb, 7 to 10 gauge; flats, 10 gauge; back and front plate, 34 gauge; adjusting setting for top of front plate in accordance with the amount of strips desired.

Now each card should be looked over to be certain that the web is clear and not cloudy and that the card is doing good work.

Next come the drawing frames. For 1-inch cotton, however, I think it better to have two processes of drawing rather than three, which is what "E. H." is using, for it is only long staple, combed stock that requires three processes of drawing, one prior to combing and two afterward, and I believe that the majority of mills using 1-inch stock now use only two drawing processes.

It is frequently the case that a loss in breaking strength can be traced directly to the drawing or attenuating process, either on the drawing frames or speeders. Perhaps these can be eliminated from consideration in this case if given reasonable speeds and proper settings, and I would suggest that the speed of the front roll average 400 r.p.m., and that the following roll settings be given a trial:

	Front to 2nd	2nd to 3rd	3rd to Back
Breaker	1 1/2 inch	1 5/8 inch	1 3/4 inch
Intermediate	1 7/16 inch	1 9/16 inch	1 3/4 inch
Finisher	1 3/8 inch	1 1/2 inch	1 5/8 inch

These distances are from center to center of roll.

Next "E. H." should check up on the gearing of the drawings and also on the break drafts, and check over the tension gearing to be sure that there is the correct amount of tension between front roll and calender roll; there should be just enough tension draft at this point to keep the end from sagging too heavily and at the same time not enough to stretch the web, thereby causing uneven work.

Then the leather top rolls should be looked over and tested for "trueness" by rolling upon a plane surface. If any are uneven they should be re-buffed in a high-speed lathe and re-varnished. The drawings should be scoured at least once in three months and careful attention must be given to oiling the top rolls, as this will prevent their dragging and causing uneven sliver.

Card, breaker and intermediate drawing sliver should be sized once each week; finisher drawings twice a day; allowing three grains each way from standard after making due allowance for weather conditions.

The next process is the slubbers, and I would suggest the following speeds, drafts and twists for these machines: Front roll speed, 12 x 6 slubber, 180 r.p.m. 60 grain sliver fed, .60 hank delivered. Draft equals 4.32—twist multiplier of 1.0 to 1.1 $\sqrt{hk}$. Roll settings for slubbers, back to 2nd, 1½ inch; 2nd to front, 1⅜ inch. This hank roving and draft is very reasonable and there is, therefore, no need to change it.

With a .60 hank slubber roving, with a draft of 5.17, it might be advisable and profitable to make a 1.55 hank intermediate roving. Using on the intermediates a twist multiplier of from 1.2 to 1.3, front roll speed not over 150 r.p.m. for a 10 x 5½ frame. Roll settings on intermediates, back to 2nd, 1⅝ inch; 2nd to front, 1 3/16 inch.

With this 1.55 hank intermediate roving, using a draft of 6.45, make a 5.00 hank roving on fine speeders. Roll settings on fine frames, back to 2nd, 1 9/16 inch; 2nd to front, 1 1/8 inch. Speed of front roll, approximately 120 r.p.m.; spindle speed, 1,300 r.p.m. Using twist multiplier of from 1.3 to 1.6, depending upon how work is running in the spinning room; about 1.4 should be sufficient in most cases. Size fine speeders every day with the exception of Saturday, and keep a "weather eye" on the "spinner's daily size."

Careful attention to sizing in the card room should eliminate uneven yarn providing the raw material is of even quality.

If there are humidifiers around the fine speeders, the temperature should be kept at 75 degrees, approximately, and the wet bulb at 67, or 8 degrees lower. The relative humidity should be kept at 66 degrees, especially on these snappy dry days.

It will be found that unless there is a proper amount of moisture circulating around the roving frames, the stock becomes brittle, snaps easily and has no "feel" at all.

Naturally, I expect to hear that humidity is unnecessary in the card room. Quite true in some cases, and especially so about the cards. It should be used there only on particularly frosty mornings to get started.

By keeping the relative humidity around the fine speeders and in the spinning room at 66 degrees, the tendency of the yarn to become brittle and snap too easily will in part be eliminated, and it will also help to make a more even yarn.

With a 5.00 hank roving, having plenty of twist, it will not "break back" or stretch on the spinning frame creel. A simple, although, perhaps, not exactly scientific way, to test this is to take several bobbins of roving, stand them end up on the floor or some other plane surface; if the roving is strong enough to start the bobbin revolving and overcome the friction of the weight of the full bobbin on the floor without breaking off short, no trouble will be experienced with it later.

From 5.00 hank roving, with a draft of 12, I would suggest that the 30s yarn be made using a twist multiplier of 4.75. A spindle speed of 9,500 r.p.m. and a front roll speed of 116 r.p.m. will give a multiplier of 4.74, which should be sufficient in the large majority of cases for this class of work.

To my mind, there isn't any special reason in believing that the addition of one pound to the weight on the spinning rolls will prove beneficial; provided the leverage is not at fault and that the weight is properly distributed. However, there is nothing like trying, and as the weight has been increased with no visible results, it is a very probable evidence a lack of weight is not the basic difficulty

EDWARD A. STUHRMAN

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in "E. H.'s" case, and that a change of weight is not the solution to his problem.

I started out to answer what at first glance seemed a simple question, but from personal experience, I know that unless one has a magic "divining rod" with which to locate the trouble, the best and surest way is to start at the beginning and check each process, and when sure that everything is all right, then move on to the next. In this way, nothing is left undone, and nothing remains to "guess at" or "think about." It is with this idea in mind that I have written this—in the hope that these suggestions will be of some benefit to "E. H." or to some other reader who may be having similar difficulty. If that aim is achieved, then this long-winded essay will have served its primary object, which is helpfulness.

I shall also be glad to hear from any of COTTON'S readers should anyone find anything in this letter that seems remiss or impractical. X. Y. Z. (R. I.)

EDITOR COTTON:

I believe "E. H. (Mass.)" is starting at the wrong end of the line to overcome his troubles and increase the breaking strength of his yarn. While there may be some trouble in the spinning, I am sure that he could do more good by changing a few things in the carding. But, of all things, he should not open the rolls on the spinning frame to 1 1/16 inches; he was all right at 1 inch for the 1-inch staple he is using.

My first suggestion in this case would be to open the cotton in as large lots as possible, and, if the mill hasn't an opener, to mix it well by hand, as "E. H." says his numbers vary pretty badly and where there are uneven numbers, there also will be found weak yarn. (I am spinning 28s hosiery yarn from 1-inch cotton and the breaking strength of the yarn averages 55 pounds. I mention this before going on, just to let it be known that the suggestions that will be made in this letter are not theories or experiments.)

Then I would recommend that he run his beaters at the following speeds, three-blade beater on breaker, 1,000 r.p.m.; two-blade beater, 1,260 r.p.m.; Kirschner beater, 1,100 r.p.m. I would set the three-blade beater ⅛ of an inch from the face of the feed roll; the two-blade beater ⅛ of an inch from the feed roll; and the carding or Kirschner beater 3/16 of an inch. The fan speed will depend altogether on the hang-up, that is the height of the dust flue, but it should be enough to pull the cotton from the beater to the screens and make it stick there rather than flop around and cause lumps and thick and thin places in the laps.

I would set the eveners on the finisher pickers so the correct weight of lap might be made with either three or four laps on the apron. This can be done by adjusting the lever that operates the evener motion. If the laps are giving trouble by splitting, I would get some good split lap preventers; there are several on the market and in a case of this kind are a very good investment.

The draft on the intermediate and finisher should not be over 4, if it is at all possible to get along with this short a draft, using a 12-ounce lap instead of the 13-ounce lap now being used. This should go through the cards with the same draft of 108 that "E. H." is now using, which will give a 46 grain sliver—or still better, use an 11-ounce lap which will give a still lighter sliver. The weight of course will depend on the amount of cards, but the sliver should be lighter, even if the doffer has to be speeded up to take care of the poundage it is necessary to put through the cards. It is better to run the cards all the time and over-time rather than to crowd them. The drum grinders should make at least 700 r.p.m. and the traverse grinders 600 r.p.m. No carder should allow the cards to get to the place where they have to be ground to be sharpened, but he should have them ground often enough *to keep them sharp.*

It is best to watch the formers that hold the top flats in place to be ground. Sometimes these get in such a shape that they do not hold the flats properly to give the right shape—that is the heel will be ground off, leaving the toe with long teeth, and when they get in this condition the only part of the flats that are doing any work are the long teeth on the toe.

Lickers-in must be kept sharp and in good condition. The bearings are also important, as this is one place where a lot of weak yarn can be made if the bearings are worn, as this will destroy the adjustment. If the bearings are badly worn, the cheapest and best way is to install new ball bearings.

Now "E. H." may not have any of these troubles, but if his 30s warp yarn is breaking at 45 pounds he must have something wrong somewhere—that's a cinch. There is the chance that he has some of last year's cotton that is causing his trouble, as there is a lot of it that is pretty bad. On the other hand, 45 is pretty low with a multiple of 5.00 because this is some twist.

On the drawing, I would suggest that the draft be equalized between the three processes. That is, instead of having a draft of six on the first two and five on the finishers, let him draft 5.66 on each process, using a 46 grain card sliver which will give 52 grain sliver on the third or finisher drawing. As a matter of fact, however, I really believe "E. H." would get better results if he would cut out the third process entirely; certainly his breaking strength would be better. But anyway, 52 grains is as heavy as the drawing sliver ought to be to spin 30s yarn.

A draft of 4.32 on the slubbers, with a 52 grain drawing sliver, will give a .71 hank roving; doubling two and a draft of 5.30 on the intermediates will give 1.85 hank roving; and doubling two again and a draft of 6 on the fine frames will give 5.52 hank roving. I see nothing wrong with the draft he is now using in the spinning room, but would suggest that he watch out for tension draft on the drawing frames and fly frames. The best way is to always be sure that the ends are running as slack as it is possible to run them, both on the drawing and fly frames. Not to the point where they will give trouble, of course, but the only way to tell whether or not they are being run as slack as they will stand is to have the fixer try them out once or twice a day to see if they will stand one tooth slacker; not all the frames, but part of them; if one will run it the others will, provided, of course, that the humidity is the same all over the room, and it should be if it is not.

The main trouble in this case, it seems to me, is that "E. H." is starting off with his sliver too heavy. This in itself would cause the numbers to vary and the breaking strength to go down, because it is necessary to overdraft in several places in order to produce 30s yarn. We had the same thing to contend with, and we couldn't see how we could reduce the weight of the card sliver and make the cards keep up, so the first thing we did was to cut the

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sliver down on the cards and bring the doffer speed up enough to make up for the production lost by using the light sliver. Then we began running the cards through the noon hour and starting them up an hour earlier in the morning. Then we went to work and equalized the drafts, and since then we haven't had any trouble with variation in numbers or breaking strength.

I would suggest that "E. H." let us hear more from him through the columns of COTTON. He shouldn't stop until his 30s yarn breaks up to standard. Any other readers who can help him should do so. The discussion will do us all good. Uncle Dudley (Ala.)

EDITOR COTTON:

An interesting problem is presented in the January number by "E. H." who seeks to increase the breaking strength of his yarn. The data which he gives does not seem to indicate directly the cause of his difficulty, as his weights, drafts and doublings all seem normal and reasonable. Evidently there is something fundamentally wrong, as is indicated by the unevenness of his yarn and the heavy twist with which he is striving to increase his breaking strength. Twist, however, will not remedy his unevenness and if he is using correspondingly heavy twist on his roving frames it may increase his difficulty.

As far as the mechanical processes are concerned, I would suggest that he look carefully for indications of "cut" drawing sliver and uneven roving. If such evidence be found it can be remedied by a better setting of the rolls on his drawing or roving frames, or, if his sliver or roving can be made to draw more evenly by decreasing the twist, immediate improvement in the evenness of the yarn ought to follow.

There is another possible cause for his difficulty at this time of the year, of which he makes no mention, and that is a lack of atmospheric moisture. If he is trying to card and spin in too dry an atmosphere, it is possible that this may be the whole cause of his trouble. A relative humidity of 50 to 55 per cent in his card room ought to reduce the percentage of card waste and improve the operation of his drawing frames and about the same humidity in his roving should enable him to run his frames with a minimum of twist and a much more even roving because of the smoothness with which the roving will draw in passing through the rolls.

I should suspect that if he can perfect the quality of his fine roving frames by increasing his humidity, that his yarn would show an immediate and marked improvement, both in evenness and in breaking strength, which would be still further heightened if he can maintain from 55 to 60 per cent humidity in the spinning room itself.

A. W. T. (Mass.)

EDITOR COTTON:

I think "E. H. (Mass.)" will find that his trouble is in the drawing frames. However, he should not expect to have his yarn break much over 50 for 1-inch American cotton. When yarn made from such a low-grade stock is breaking in the neighborhood of 54 to 56 I call it very good.

The first thing I would do if I was in "E. H.'s" shoes, would be to reduce the weight of the lap to 11 ounces. The weight of the card sliver is o k like it is. Then, on the breaker drawing, I would set the rolls as follows: For common leather rolls, center to center, 1st to 2nd, 1 3/16 inches; 2nd to 3rd, 1¼ inches; 3rd to 4th, 1⅜ inches. For metallic rolls, 1st to 2nd, 1¼ inches; 2nd to 3rd, 1 5/16 inches; 3rd to 4th, 1 7/16 inches. "E. H.'s" breaker drawing sliver seems o k.

On the intermediate or second process drawing I would reduce the weight of the sliver to 45 grains and increase the speed in proportion. However, I would not run the front roll at a speed exceeding 380 r.p.m. for common rolls nor more than 450 r.p.m. for metallic rolls. I would set the rolls on the second and third processes of drawing 1/16 of an inch closer than on the breaker drawing, and reduce the weight of the finished drawing to 40 grains, speeding up proportionately; "E. H.'s" 60 grain finished drawing sliver is much too heavy.

The .60 hank roving on the slubber seems all right, as do those on the intermediate and fine frames. On the spinning frame I would set the rolls at 1 1/16 of an inch.

Let "E. H." try the foregoing hang-up on a card or two and then run it through separately to the ring spinning frame; after the change I believe he will find the work on all fly frames more coherent and he may be able to take out a tooth of twist.

A few years ago I was up against a proposition similar to the one "E. H." has. I was carder in one of our yarn mills and had been in charge of the room but a few hours when I sized the drawing sliver and found it to be 70 grains to the yard. I called the second hand and asked him if my predecessor had changed the weight of the finished drawing sliver, and he replied that he had, but that it had been some time before, and added that prior to the change the weight of the sliver was 85 grains, but when he had enough roving on hand he had reduced it to 70 grains. (Do you wonder why the man lost his job?)

The filling yarn was full of thin places, but when I reduced the finished drawing sliver to 40 grains the conditions in the mill improved almost immediately. Some light places appeared in the yarn, but nothing like what occurred in the old yarn. I am sorry that I have no record of the breaking strength, but I know it was in the neighborhood of four or five pounds better after I reduced the weight of the finished drawing sliver.

I hope "E. H." will get the right dope in these columns, and in closing would like to repeat that I am almost positive that his trouble is in the drawing hang-up.

Wash (Mass.)

EDITOR COTTON:

I would offer the following suggestions to "E. H. (Mass.)" who wants to increase the breaking strength of his yarn, and asks for suggestions that will help him do this. If he will shorten the drafts in the carding department from those which he gives in his letter, and will see that the feed plates on his cards are not set too close to the licker-in, I believe he will improve the strength of his yarn. If the setting is too close, he cannot get a good breaking strength on the yarn. I find that a number 12 gauge is a good setting for the feed plate to the licker-in for 1-inch American cotton, such as your correspondent indicates he is using.

I also would suggest that "E. H." have the drawing rolls properly cleaned and oiled and have the cleaning done regularly, not allowing dirt to become packed in the flutes of the rollers.

Following is a lay-out of drafts and weights for the

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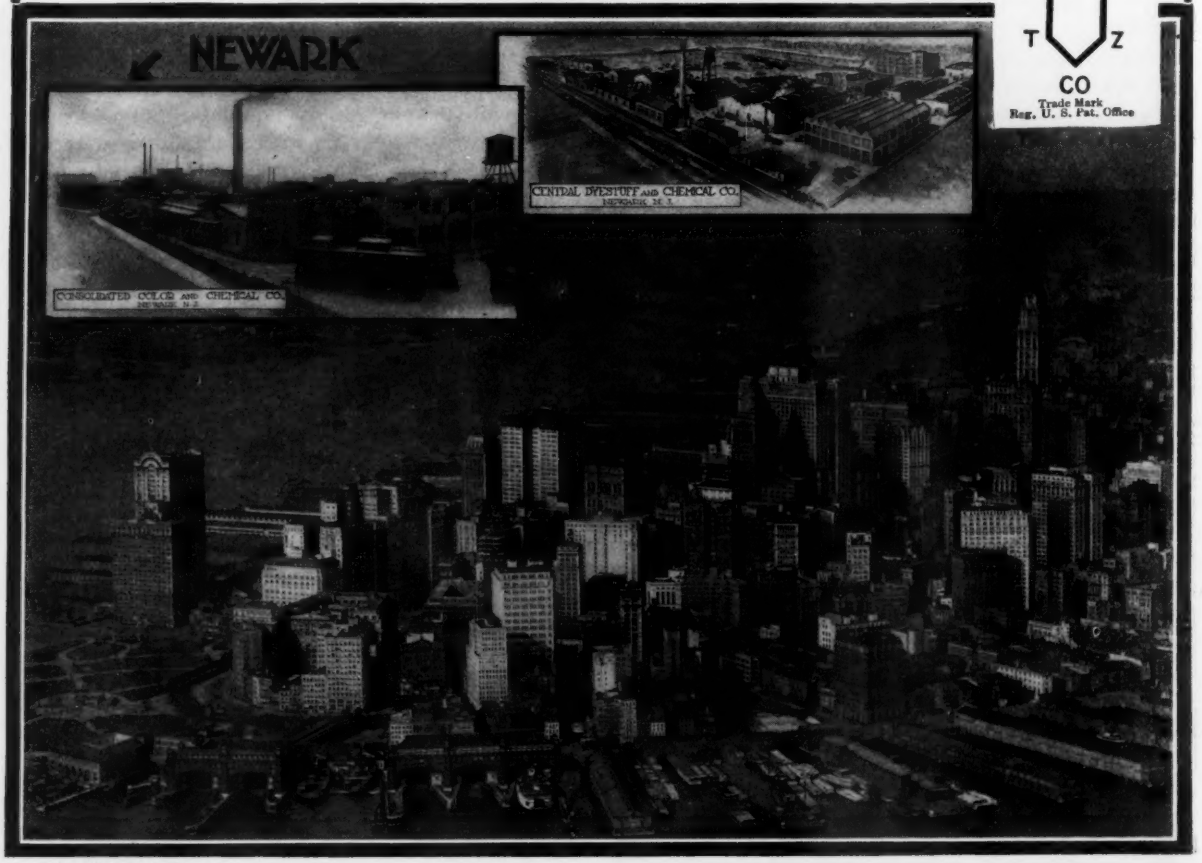

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carding department which I believe "E. H." will find to be a good one for his work. It will be noted that in several places it is at variance with the lay-out "E. H." is using, but I believe that the changes shown will help him in getting a better break. Here is the lay-out I would suggest:

Weight of picker lap, 11 ounces.
Weight of card lap, less 5 per cent, 4572 gr.
Draft of card, 100.
Weight of card sliver, 46 gr.
Doublings on first process drawing, 6.
Draft on first process drawing, 6.
Weight of first process drawing, 46 gr.
Doublings on second process drawing, 6.
Draft on second process drawing, 6.
Weight of second drawing sliver, 46 gr.
Doubling on third process drawing, 6.
Draft on third process drawing, 5.50.
Weight of third drawing sliver, 50 gr.
Draft on slubber, 4.32.
Hank roving of slubber, .72.
Doubling on intermediates, 2.
Draft on intermediates, 5.00.
Intermediate hank roving, 1.80.
Doubling on fine frames, 2.
Draft on fine frames, 6.10.
Fine frame hank roving, 5.50.

If "E. H." will use only the first and second processes of drawing and do away with his third process, and shorten his slubber and intermediate drafts, as indicated in the foregoing suggested lay-out, I believe he will get a much better breaking strength. His present draft of 10.91 on the spinning frames is good for making his 30s warp yarn, but he should have left his rollers set to at least 1 1/16 inches, instead of closing them to 1 inch, and my suggestion would be to open them to 1 3/32 inches. He will find that 5.00 times the square root of the number as twist will weaken his yarn instead of strengthening it, and I would suggest that he use about 4.80 times the square root. His 2¼-pound weights are sufficiently heavy for the count of yarn he is making.

I would suggest that in doubling the roving, he run one strand from the top creel and one strand from the bottom creel, as this will give a more uniform stress on the roving, and that will help in keeping the yarn more even.

I would like to hear what results "E. H." gets if he tries these suggestions. Carder and Spinner (Ga.)

EDITOR COTTON:

I would offer the following suggestions to "E. H." in an effort to assist him with his breaking strength. He does not say how many processes of picking he is using or what is the speed of the beaters. If carding beaters, they should not run over 800 r.p.m., unless the cotton is feeding very fast; two-blade beaters should not run more than 950 r.p.m.; and if a three-blade beater is used on the breaker it should not be run over 600 to 700 r.p.m. I would suggest that "E. H." change the weight of his lap from 13 ounces to 12 ounces; or, I think, 11½ ounces would be better.

If I was "E. H." I would leave off the third process of drawing and keep the weights of the other two processes the same as given in his letter. I would suggest, however, that he change the draft on his slubbers from 4.32 to about 3.50. I assume that he is running the tension on his drawing, slubbers, intermediates and speeders as slack as he can without having to take them up. I would suggest that he use 4.75 for his twist multiple instead of 5.00. Too much twist in roving will cause weak yarn. High speed drawing rolls will cause weak yarn as will many other things, all of which I assume "E. H." has looked into. I hope to see many other suggestions on this subject for all warp yarn spinners are interested in getting more strength for their yarn, which means more profits to their mills. Reader (N. C.)

EDITOR COTTON:

In replying to "E. H.," by assuming that his 1-inch staple cotton is similar in grade, with an unevenness as to uniformity of length of fiber as most cottons of this kind are, I can write and be better understood. For in these conditions only, after the organization of yarn is finally established, lies the drop in breaking strength.

I believe the lay-out in "E. H.'s" carding department could be improved if it was possible to change the hank roving on the slubbers to .70 and on the intermediates to 2.00; the fine frame would then make 5.50 hank roving. This will make the draft on the slubber a little longer, but by using good judgment in not setting the first and second rolls as well as the second and third rolls, too far, this draft, which will be 5.03, will not in the least injure the work or the strength of the yarn.

The draft of .70 into 2.00 will then be shortened to 4.85, setting the rolls as follows: 1st and 2nd, 1 1/16 inches; 2nd and 3rd, 1½ inches. The draft of 2.00 into 5.50 will be shortened to 5.5, setting the 1st and 2nd rolls 1 1/32 inches, and the 2nd and 3rd, 1 5/16 inches.

If it is impossible to change the hank roving on the frames mentioned, he can set the rolls carefully and not on the strong side. Wide roll settings and long draft do double damage, for a wide spread allows the long draft a greater chance and distance in which to pull, and it certainly will.

The spun yarn should have a twist of 4.75 times the square root of the hank roving. The first two rolls should be set ⅞ of an inch, with about 4.5 per cent moisture in the yarn.

For the last six months we have had in our mill a condition similar to the one described by "E. H." Various experiments were tried, and it was found that the previous organization on frames given here gave a splendid break, but not a standard break, as it would be hard to get an average break that will be standard day in and day out, because of the existing conditions in the make-up of the bales, some bales running barely one-inch, some over. When a lot came in under an inch, all settings of rolls and drafts were a little too much, then for a day or so, down went the break and uneven sizing was the result.

This was checked up by stapling bales and lots, and mixing in different ways and the results noted. Due to the great amount of under-staple, or less than 1-inch, the spinning rolls, as well as the rolls on the other frames, were not set as if the staple ran a good 1-inch. If the room was too warm and excess moisture 6 per cent, the break was affected and the work did not run so good. So a temperature of 70 degrees with 4.5 moisture in the yarn is used.

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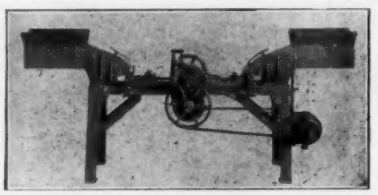

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We have been up against 13s yarn, single roving, of 1.70 intermediate, and have reached 1.24 pound break on 1-inch cotton, against a 1.32 pound standard break, which is considered good. Our picking, carding and drawing organization is the same as "E. H." is using.

K. (Ohio.)

EDITOR COTTON:

In going over the weights and drafts given by "E. H. (Mass.)" I should say he could strengthen his yarn by using the following lay-out, and I will give my reasons for the changes that I suggest be made in his present organization.

I would leave the pickers alone.

The card draft of 108 I should say is a trifle short. I would make it 120, with a sliver of 45 grains. As one other contributor has pointed out, the draft on the cards is not as essential as the draft on rolls, provided it is kept within the radius of from 100 to 140, and I believe "E. H." will get better work by making the changes indicated.

He has three processes of drawing, but I notice that he is making the finisher drawing do all the drafting. Why not split the draft among the three drawings as follows: Breaker drawing, 45 grains, six ends up into 50; intermediate, 50 grains, six ends up into 55; finisher, 55 grains, six ends up into 60. This will help make more even work, which tends to make strength. Also, on the drawings, he should see that the settings are all right. I would suggest setting from ⅛ to 3/16 of an inch over the staple on the front and second rolls, and from ¼ to 5/16 of an inch over the staple on the second and third rolls; and on the third and fourth rolls from ⅜ to 7/16 of an inch over staple. The settings on the drawing frame depend a whole lot on the bulk going through, as "A. B. C. (R. I.)" explains very clearly on page 187 of the January issue.

"E. H.'s" slubbers are o k.

On the first intermediate, the draft is 1.35 more than the slubbers and on the fine frame only .80 more than the first intermediate. Now, I should leave the first intermediate just as it is, but on the fine frame I would make 6.00 hank roving with a draft of 7, which is 1.33 more than the first intermediate. This will also cut the draft of the spinning to 10, which is plenty low enough for 1-inch cotton, no matter of what grade.

In regard to the spinning, I will leave that to some spinner.

Following is the complete lay-out I would suggest for "E. H.'s" work:

Weight of picker lap, 13 ounces.
Weight of card lap, less 5 per cent, 5403 gr.
Draft of card, 120.
Weight of card sliver, 45 gr.
Doublings on first process drawing, 6.
Draft of first process drawing, 5.4.
Weight of first drawing sliver, 50 gr.
Doublings on second process drawing, 6.
Draft on second process drawing, 5.45.
Weight of second drawing sliver, 55 gr.
Doublings on third process drawing, 6.
Draft on third process drawing, 5.5.
Weight of third drawing sliver, 60 gr.
Draft on slubbers, 4.32.
Hank roving of slubbers, 60.
Doublings on intermediates, 2.
Draft on intermediates, 5.67.
Intermediate hank roving, 1.70.
Doublings on fine frames, 2.
Draft on fine frames, 7.
Fine frame hank roving, 6.00.
Doublings on spinning, 2.
Draft on spinning, 10.
Spinning number, 30s yarn.

G. H. T. (Mass.)

EDITOR COTTON:

In considering the difficulties of "E. H. (Mass.)," who wants to increase the breaking strength of his yarn, the first and most essential feature to be looked after is the mixing of the cotton in the opening room; he should be certain that the cotton is getting a thorough mixing. Generally when we say we are running 1-inch cotton, we have more ⅞-inch than we do full 1-inch stock.

Then he should look to the settings of the beaters on the pickers, for settings that are too close will injure the staple, and cause weak yarn. Also, the setting of the feed plate to the licker-in on the card should be carefully looked after, and he should be certain that they are not set too close. If using full 1-inch cotton, I would set the feed plate to a 17 gauge.

Next, I would advise "E. H." to reduce the weight of his laps to 10 ounces, making a 46 grain card sliver and, with a draft of 5.30 on the first drawing, make a 52-grain sliver; then use a 5.60 draft on the second drawing and make a 55 grain finished drawing sliver. I would by all means cut out the third process of drawing and use only two processes, and I would take the machines formerly used for the third process and use them in the two processes, and then I would reduce the front roll speed, getting it down to 150 turns per minute if this is possible. The slower the better. I am one of the strongest advocates of two-process drawing, and have often been called a crank on this subject, but I do think that three processes is too much, especially for 1-inch cotton. Certainly better results can be secured from the lower speed than from the third process of drawing.

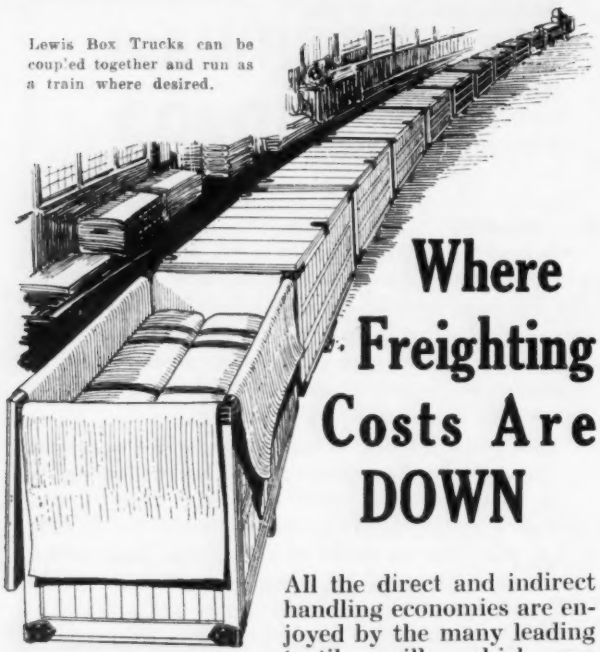
Taking the 55-grain finished drawing sliver to the slubbers, I would use a draft of 3.90; on the intermediates I would suggest a draft of 5.50; and on the speeders a draft of 6.00. Then, I think, "E. H." should reduce the spindle speed in the spinning room and use 4.75 times the square root of twist instead of 5.00, with a draft of from 11.50 to 12.00 on the spinning. He should leave the weights like the machine builders sent them out, and set the spinning rolls back to 1 1/16 inches for full 1-inch staple.

Mike (Ga.)

EDITOR COTTON:

I am always anxious to receive COTTON, and the first place I turn to is the discussion pages which tell "How Other Men Manage." Being more or less interested in the subject of breaking strength, the letter from "E. H. (Mass.)," was among the first to attract my attenion in the January issue.

LEWIS



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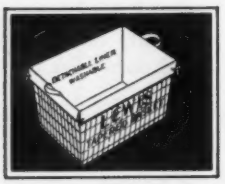

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STATION A

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"E. H.," like the most of us, wants to increase his breaking strength, and as I glanced over the list which gives his weights, drafts and number of hank roving, I immediately saw that a serious trouble was the draft on his fine frames, namely, 6.47. This, to my mind, is excessive, or at least I have made an awful blunder by trying to make 30s yarn myself from 5.50 hank roving when the fine frame roving was made from 1.75 intermediate roving, the draft on our fine frames being 6.66. The yarn made from this roving would work the spinners to their full capacity; it would hardly spool or warp, and the breaking strength averaged about 45 pounds. It did not take but a few days to learn the trouble, for had we not found it, we would have been shut down, or at least the frames which were on the 30s would have had to stop for it was giving trouble everywhere.

Now I would suggest that "E. H." be sure his roving has not been twisted too much, for this one trouble will in most cases cause the yarn to run uneven and naturally break weaker than it would if it had just enough twist to pull off the bobbin. Some readers may disagree, but if they give it a fair test they will see that the twist must be inserted in the spinning process.

If "E. H." is not in position to make a lighter lap, I would suggest that he draft 6 on his third process of drawing, which will give him .166 hank roving; then drafting 4.50 on the slubbers will give .75 hank roving; drafting 5 on the intermediates making 1.87 hank roving; drafting 5.58 on the fine frames which will give approximately 5.23 hank roving; making his draft on spinning a little less than 11½. If it is desired to make fewer changes and not require extra gears for his spinning, and the management insists upon his using 5.50 hank roving, then I would suggest that the finished drawing sliver remain the same and that he draw on the slubbers 5 which will give practically .69 slubber hank roving; the draft on the intermediates may remain the same—5.67—and the intermediate hank roving will be 1.97; then he should use a draft of 5.58 on the fine frames and it will make practically 5.50 hank roving. By making the last change suggested it would be easier, but I would prefer to have the slubber hank roving around 4.50 and the long draft on the spinning.

I would suggest that he use the rollers at 1 1/16 inches instead of 1 inch. If he wants the best breaking strength, he should put in from 4.75 to 4.90 times the square root of twist, and it would not be much trouble to try a frame on 4.50 to 4.75 times the square root twist and note the results and then be governed accordingly.

In this connection, and for his information, I would say that we do not use the intermediates in our picker room, and have only two processes of drawing, we do not rework our strips, and make 30s yarn from 5.10 hank roving, double creel of course, and our numbers are good as to variation and the breaking strength for the last month averages about 55 and the average number 29.50.

I would further suggest that "E. H." study his changes carefully, go about it slowly, making but slight changes until he has made up his mind what is best for his work, for it is a fact that he will get into trouble if he undertakes to change the entire room before knowing what is best suited, and by all means he should make the first change on the draft of the fine frames, either directly or indirectly, for in my estimation, this is his greatest evil.

N. C. (North Carolina.)

Setting the Licker-In.

EDITOR COTTON:

There has been such a great deal of spirited discussion among the carders at every sectional meeting of the Southern Textile Association where carding has been discussed, as well as much comment in COTTON, relative to the proper setting of the licker-in, that it appears that this matter must be of the greatest importance from a carding standpoint if good work is to be done.

I have heard a great amount of learned discourse pro and con as to the correct setting for different kinds of work, and what a big difference in the work a very slight change is likely to make. As all the recommended settings varied only by a few thousandths of an inch, I have wondered if the carders realize the extreme difficulty of maintaining such accuracy in actual operation.

Does the average carder realize when making his setting that there is probably more play in the licker-in bearings than the amount of the setting that he is making? Does he appreciate the impossibility of holding his licker-in to a setting of ten one-thousandths of an inch when the lost motion in the licker-in bearing is often two or three times this much? Yet this is often the case. I have seen a good many lickers-in that could be shaken in the boxes at least a sixteenth of an inch, which is more than sixty-two one-thousandths of an inch.

How, then, can any reasonable degree of accuracy be obtained under these conditions? It can't, of course. No matter how careful the man who sets the licker-in may be to get his gauge just right, the moment the belt is put on, the setting is shot to pieces, and when the belt tightens under load it makes matters worse. Carders have told me that even after the most careful setting of the licker-in, that the teeth would strike the card clothing, and they would have to back the leader off until by trial and guesswork they had it set where it would run satisfactorily.

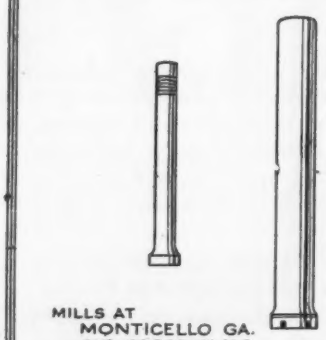
It appears then if licker-in settings are so vitally important, it is worth something to get them right and be sure they will stay right. There are two ways to do this. One is to replace the bearings every time they show a slight amount of wear. The other is to replace the worn bearing with a bearing that will not wear; that is, a ball bearing.

Ball bearing boxes can easily be mounted on the leader of practically any make of card, and in many cases the ball bearings are cheaper to use than the plain ones, due to the fact that where the shrouds are used as bearings, they have to be replaced if plain bearings are renewed, whereas with ball bearing boxes the old shrouds can be retained, making the installation of the ball bearings very economical.

As ball bearings have an accuracy of better than one thousandth of an inch, and as they do not wear appreciably, they make the ideal bearing for lickers-in. Added to this, they require practically no lubricant, effecting a considerable saving in oil, and more than that, keeping oil out of the stock, which is difficult where plain boxes are used.

Several mills that have changed to ball bearings on lickers-in report that if they had no other advantage over the plain type, that the feature of keeping oil out of the licker-in and therefore off of the main cylinder would soon pay for the change.

Perfect and reliable settings, combined with cleanliness



MILLS AT
MONTICELLO GA.
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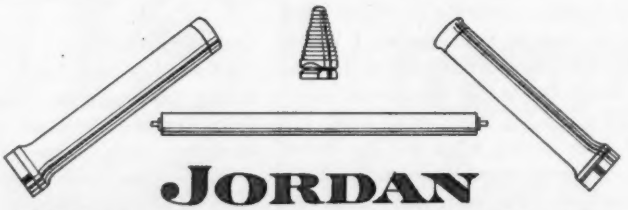

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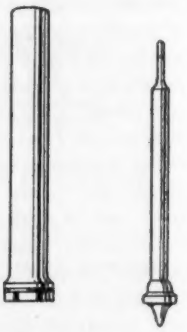

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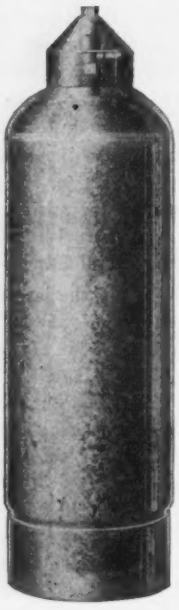

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and oil economy, form a powerful argument for the ball bearing on card leaders.

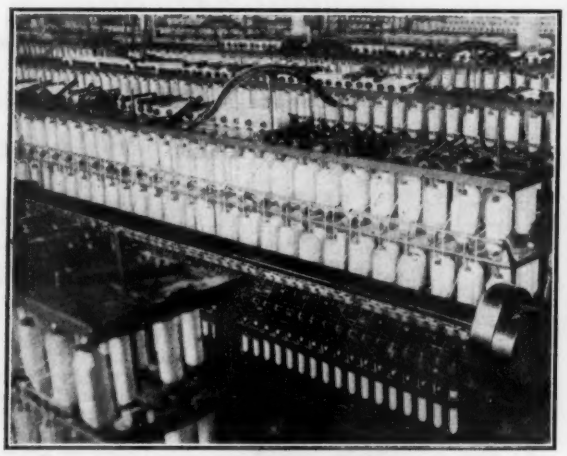
Ball bearings are also advisable in many instances on main cylinders of cards, though this is not as important as on the licker-in. The main cylinder is heavy enough to keep in the bottom of the bearings, and unless run dry so that the surfaces seize, there is little likelihood of the cylinder not running fairly true. However, on old cards, where the cylinder journals are very badly worn, it is advisable when replacing these to put on ball bearings as the savings in power and oil, as well as in cleanliness, will justify the expense. A. P. (S. C.)

A Handy Bobbin Collector.

EDITOR COTTON:

Ever since the advent of the modern ring spinning frame there has been a great deal of friction between the bobbin boys and the spinners. This friction goes so far in a great many instances that the one or the other leave or have to be discharged causing a large percentage of labor turn-over in the spinning department.

This difficulty is considered by most overseers as one of the necessary evils of the job. When help is easy to obtain then, of course, it does not look like such a big problem but when help is scarce then it assumes gigantic proportions. That every change of help costs the mill so much money is realized by every good overseer, and to

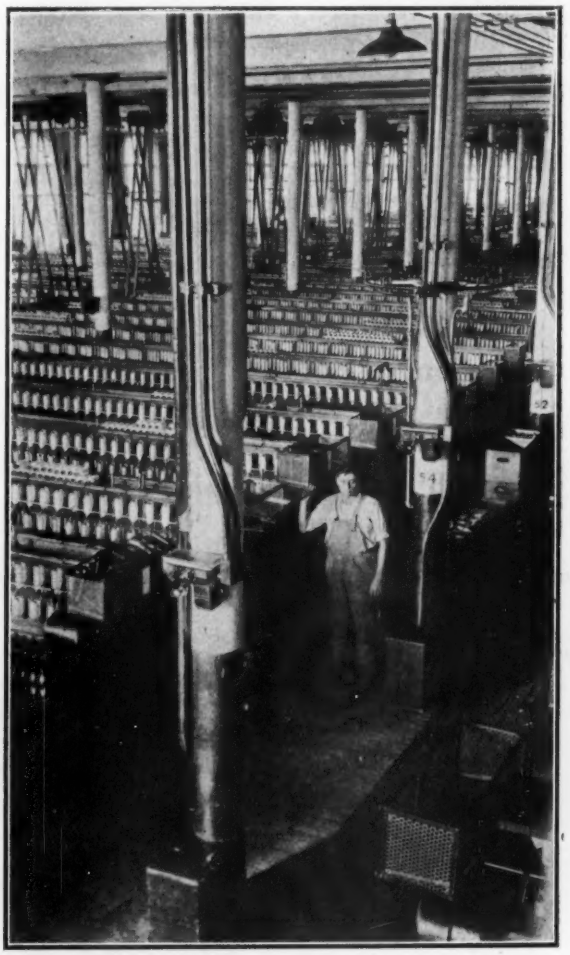


A ROOM IN THE BUTLER MILL BEFORE INSTALLING THE DEVICE. NOTE BOBBINS ON TOP OF THE CREELS.

eliminate this turn-over and friction was a large problem during the war and for some time afterward, and in considering the necessity, one overseer has found a successful remedy.

Another phase of the situation existing between the boys and the spinners was the unsightly mess of empty bobbins on top of the spinning frames and even on the floor. There the bobbins remained until the bobbin boy came around to collect them, and then the trouble started, for in collecting the empty bobbins some would fall and break out several ends; furthermore, the bobbin box would take up the full alley and keep the spinner out, and then after the bobbin boy had passed by the spinner finds ends down here and there and of course this would cause hard feelings.

A new patented device consists of a groove on each side of the spinning frame made of two wooden strips fastened to the creel lengthwise so that the spinner may place the empty bobbins in this groove and push them along gradually so that they drop into a box made from sheet metal and fastened on the end of the frame. There is a door in each box so that the bobbin boy, as he passes with his empty truck along the main alley, shoves it under each box, opens the door and lets the empty bobbins fall into his truck. This does away with the necessity of having the



A PHOTO MADE AFTER THE DEVICE WAS INSTALLED.

boy enter the frame alleys to collect bobbins and get in the spinners' way. It also eliminates the unsightly mess of empty and full bobbins and gives a clear creel for the full bobbins to be stored.

The Butler Mill of New Bedford was the first one in that city to be equipped with this new device. Their present overseer of spinning, Mr. Wood, is the originator. Mr. Wood states there has been no friction whatever in this line since the installation, and that the help all seem to like the arrangement. The device has been in use in the Old Colony Corporation of Taunton, Mass., for the past three or four years, and they state it has been a great help.

W. M. (Conn.)

"Truth," says the adage, "is mighty."
Yes.
Mighty scarce.

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"Here's the best we ever had. The men like it better because it does not rot the belts by drying out their life.

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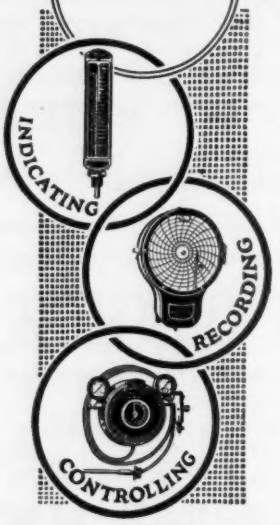

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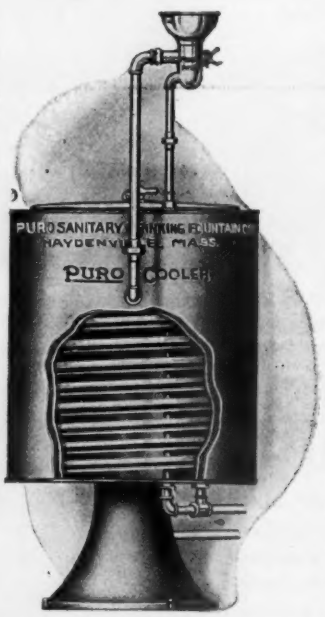

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Workmen require a cool and a pure drink, and PURO Coolers supply it.

Cooler is equipped with our "Medal Winner" Junior Fountain, which can be furnished with straight up or side stream bubbler.

Bubbler cannot be touched with face or lips, perfectly sanitary and fulfills all state law requirements.

Fountain and all connections of solid bronze cast metal beautifully finished and heavily nickel plated.

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Economical Lubrication of Mills.

EDITOR COTTON:

The oil bill for any mill for a year is a large item of expense. All mills waste more or less oil. This waste of oil is not only a loss on the original cost of the oil, but wasted oil causes many other serious losses as follows:

The excessive oil used in a mill also takes extra time of the oilers which must be paid for.

Excessive oil used on bearings very often drips, injuring fabrics and causing remnants and seconds.

Dripping oil causes oil soaked floors increasing the fire hazard, as well as other accidents incident to slippery floors. Wasted oil on all machinery causes much extra dirt which gets on clean stock, and which if kept clean, would have sold at a higher price, when it had been made into finished goods, or sold as clean waste instead of dirty waste.

Extra dirt, oiled and gummed up machinery takes much extra time to clean. This takes extra labor which must be paid for. Besides the extra labor it takes more clean waste with which to clean the machinery. This clean waste could have been sold at a much higher price than after becoming soiled by being used for cleaning off excessively oiled machinery.

More oil than required on bearings, after a time clogs some, causing overheated bearings. Some of those bearings become burned out, thus involving the extra labor of repairing and the consumption of supplies for repairs.

Another loss from this source is the consumption of extra power. Oil clogged and caked-in bearings increase the friction thus defeating the very purpose that careful oiling with less oil would have accomplished.

Again, overheated bearings, and clogged spindle bearings cause a big annual loss of production—not only a loss of production but also a big loss in money which is paid out to operatives big and small, who were on hand putting in their time to put through all the regular production if there had been no interruption owing to excessive oiling troubles.

Excessive consumption of oils also involves extra trucking, freight and more laborers, etc., to handle than the much smaller normal consumption would require.

And so we might go on enumerating other losses which are caused like the foregoing, either directly or indirectly, on account of excessive oiling.

From the foregoing it can be definitely understood that the needless and excessive use of oils for the lubrication of our mills creates a large expense account.

Poor grades of oil is another source of expense.

Insufficient oiling also causes costly bills for repairs.

Improper care of oils on hand may cause much loss owing to leaks in various ways, even to the over-filling and dripping of oil cans.

There is also another loss which may occur where oils may be used outside of corporation requirements by the operatives. Using ill-adapted oils is also a source of loss —such as the use of thin oils where heavy oils should be used and vice versa.

Dirt-clogged oil holes and oil tubes preventing the oil from reaching the bearings is another evil.

In any mill it is not difficult to estimate somewhere near the amount of oil required to keep each department properly lubricated. This can be done by laying out a schedule as shown by the sketch.

MILL NO.____ LUBRICATION SCHEDULE DATE _____

RECORD OF EFFICIENCY

DEPARTMENTS	TOTAL BEARINGS	KIND OF OILS REQUIRED	AMOUNT OF OIL TO BE APPLIED	AMOUNT OF OIL ACTUALLY USED	% GAIN	% LOST	REMARKS
ECONOMIZERS							
ENGINES							
PUMPS							
MACHINE SHOP							
MAIN BEARINGS							
LINE SHAFTINGS							
PICKER ROOM							
CARDING "							
SPINNING "							
WEAVING "							
CLOTH "							
ETC.							

The lubricating engineer, or oil custodian can easily gauge the requirements either by an estimate based upon his good judgment or it may be based upon actual consumption covering a given period of time, making allowances for possible excessive oiling; but the best manner in which to ascertain the actual oiling requirements of any mill, is for a competent oiler to make a sufficient test of each department over a definite period to show exactly the minimum amount of oil needed to keep the various bearings properly lubricated. Having this information in hand, the schedule should be laid out as shown by sketch. Also notices should be posted in each department as follows: Kind of oils required; number of bearings to be oiled; how often to be oiled; amount of oil allowed, etc.

Copies of the lubrication sheet should be on file in the oil repository and with the various heads having to do with

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to be free of chemicals and
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Peroxide-bleach by which alone
these qualities are obtained.

THE ROESSLER & HASSLACHER CHEMICAL CO.
NEW YORK

the management of the plant.

Having the system established the next step is to see that the lubrication of the entire mill is done accordingly and reduced to as faultless a system as possible.

A bearing which is kept clean and in good shape, will require only a certain amount of the proper oil, and no amount of oil used above that quantity will make the bearing work any better. As previously stated, over-oiling is more likely to make matters much worse and start on a journey of destruction.

On the other hand, scanty oiling is also disastrous. It is, of course, vastly better to have a drop more of oil on the bearing than is actually needed rather than to ruin a bearing with a drop short of enough oil.

The oiling system of a mill requires constant attention, to prevent wastes and many apparently unaccountable losses.

In connection with the latter statement we are brought to other problems which effect the economical lubrication of a mill. They are as follows: Leaky oil cans and tanks; holes too large in the oilcan stem; overtight belts and banding; over-speeded machinery; over-tight bearings; improper setting of gears and adjustment of machine parts; poor repairing; oil cans which are not adapted—stems too short or too long; spring bottom oil cans not working properly, cracked and leaky stems; machinery operating part time, but being oiled as frequently as though operated on full time schedule; excessive consumption of oils on account of operating plant with old and antiquated machinery, etc.

The economical lubrication of a plant is a broad subject, and one which covers a large field of operations. A very large plant can well afford to hire a competent lubricating engineer, whose sole job it is to have full charge of this end of the business. He will study its problems and eliminate the wastes substantially enough to turn in a profit over his salary. H. D. M. (R. I.)

Cotton Mill Lighting, Part 3. *

(*Continued from page* 332.)

Ring Spinning, Twisting.—By the time the cotton has reached the spinning room, it has been drawn and twisted to a small diameter. Here good vision and plenty of illumination is needed to properly keep watch of the bobbins and see that none are running idle with the yarn broken. Both sides of spinning and twisting frames are work faces thus requiring that the outside aisles next to the walls must be provided with the same illumination as the inside aisles. The general practice is to begin with the outside work aisles and place rows of lighting units in alternate work aisles. Each row should contain reflectors spaced 10 to 16 feet apart. An illumination of 6 to 9 foot-candles for undyed yarns, and 9 to 12 foot-candles for dyed or mixed yarns is recommended. Two possible systems of spacing are suggested in Figs. 4 and 5. The first is more commonly used for undyed yarn spinning and the second is sometimes convenient where higher values of illumination are desired or where the spacing between columns is more than the common 8 feet. Having rows of reflectors in alternate aisles, light reaches all of the working surfaces as shown in Fig. 6.

Spooling.—Spooling sections commonly occupy a small

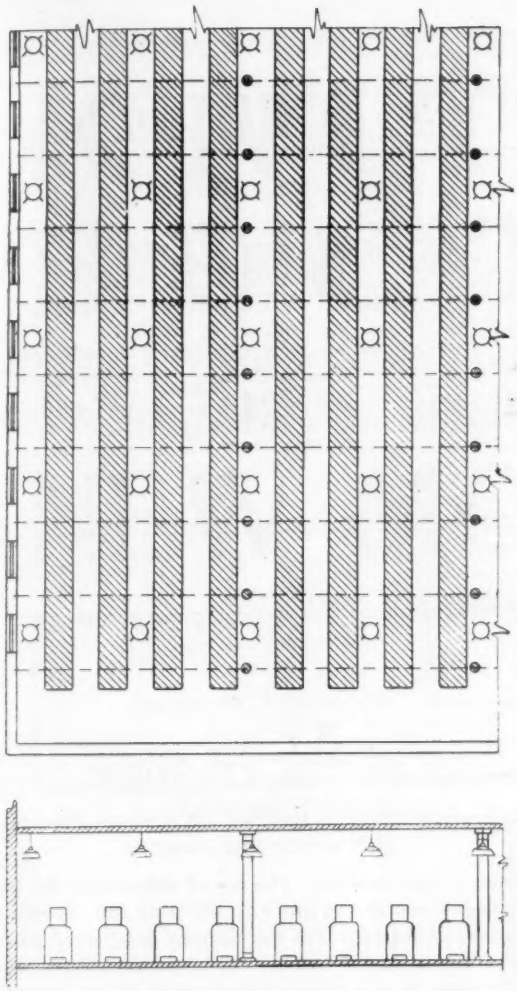

FIG. 4. ONE SPACING ARRANGEMENT COMMONLY USED IN SPINNING ROOMS.

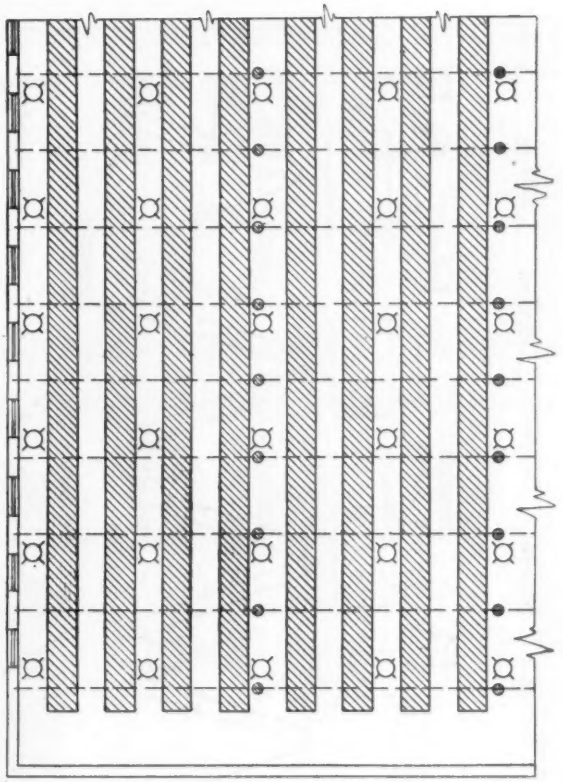

FIG. 5. AN ARRANGEMENT OF LIGHTING UNITS PERMITTING OF A CLOSER SPACING IN THE WORK AISLES THAN FIG. 4.

part of the mill space. Any system which gives satisfactory illumination for spinning will also satisfy the requirements for spooling.

Warping.—In warping, it is best economy to have plenty of well diffused illumination at both the creel and the beam. The warp which is being wound from the spools

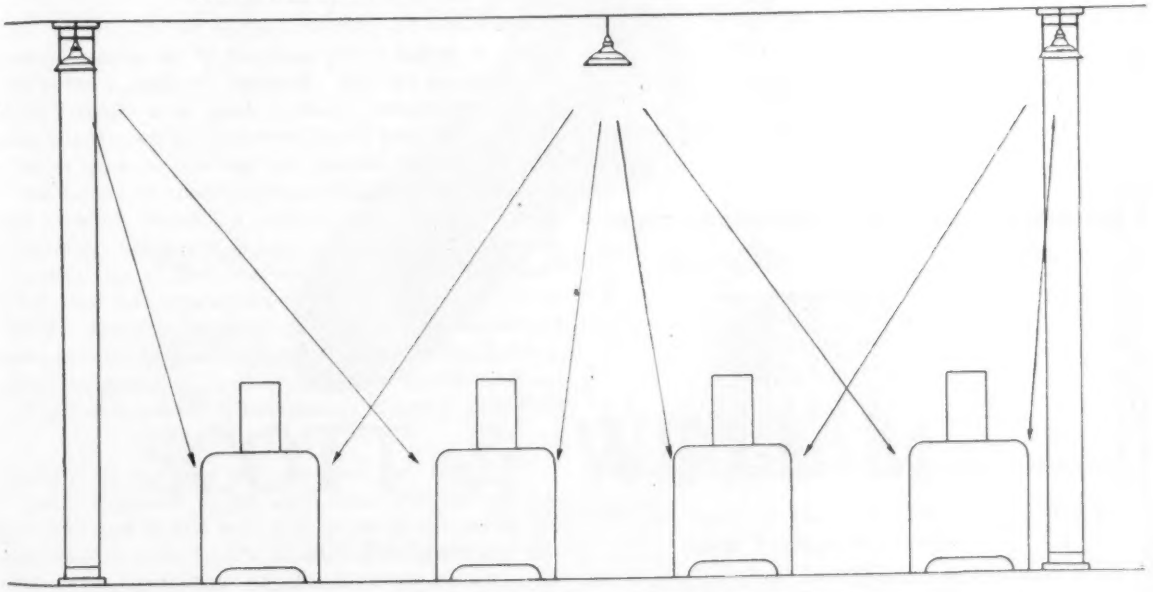

FIG. 6. THE LIGHT REACHES ALL WORKING SURFACES OF THE SPINNING FRAMES WHEN ROWS OF UNITS ARE PLACED IN ALTERNATE WORK AISLES

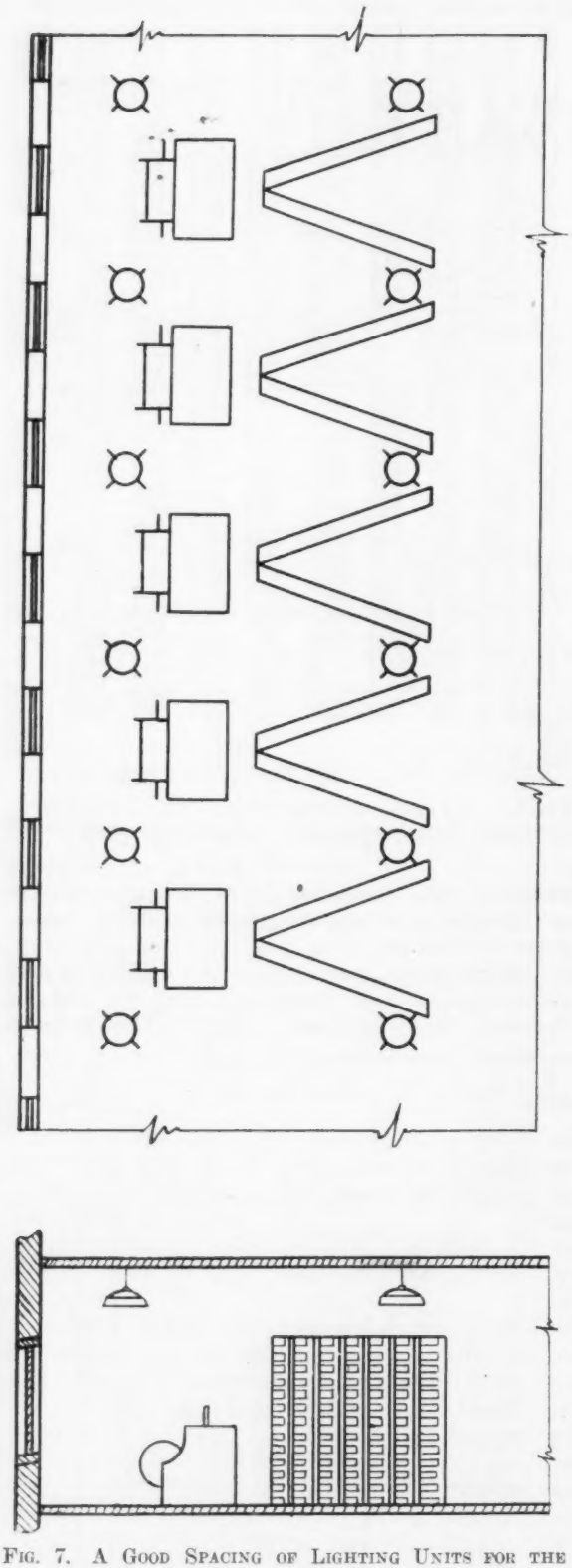

FIG. 7. A GOOD SPACING OF LIGHTING UNITS FOR THE WARPER SECTION.

on the V creel onto the section beam has been spun to its final small size and twist and the visual requirements are necessarily exacting when following a broken thread from the beam to the creel. An illumination of 6 to 9 foot-candles is good practice. The row of reflectors at the beam end should be about in line with the beam and between the individual machines. The too common practice of putting the reflectors directly behind the machines instead of between them, causes the operator to work in her own light when tying a broken warp. A good arrangement for a warping section is shown in Fig. 7.

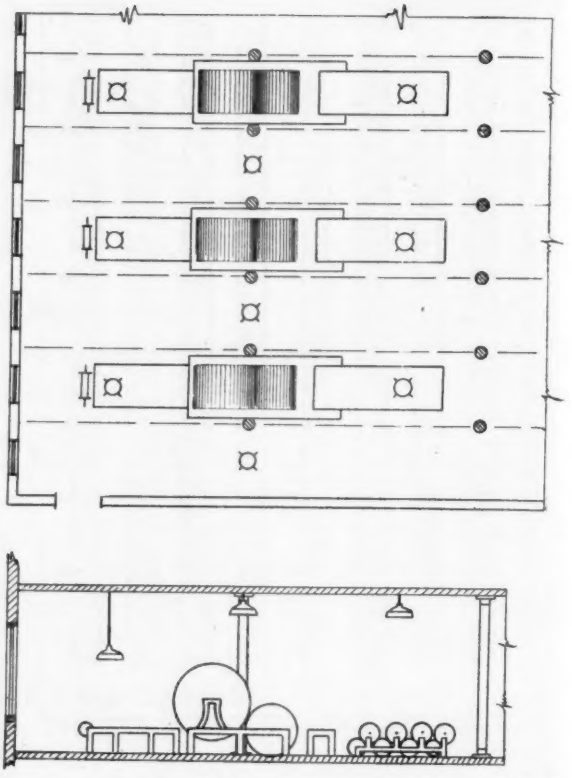

FIG. 8. SHOWING THE LOCATION OF OUTLETS AND LIGHTING UNITS AT THE SLASHERS.

Slashing.—The best illumination for slashing, or warp sizing, is needed at the head end of the slasher between the combs and the beam. To obtain this light, a 100 or 150-watt bowl-enameled Mazda C lamp in a standard RLM dome may be hung 4 to 6 feet above the warp at the place where it is most needed. In case colored warp is being sized, the 150-watt unit will undoubtedly be needed and if the warp is dark blue or black, a 200-watt unit over each slasher at this point would not be considered extravagant. General illumination will do very well for the creel end of the slasher. It should be remembered that light is desirable between all of the individual machines. If the starch boxes are to be inspected at frequent intervals, some provision should be made by a local light extension under the hood. A typical arrangement is illustrated in Fig. 8.

It has been said that "as a man readeth so he thinketh," and also that if a man's daily diet of reading is known it will be easy to figure out just what sort of man he is and will be. There is more than a little truth in these sayings. A man who reads for the improvement of his business is likely to work out that improvement, since he will think along those lines and make or find the opportunities for improvement.—*The Canner.*

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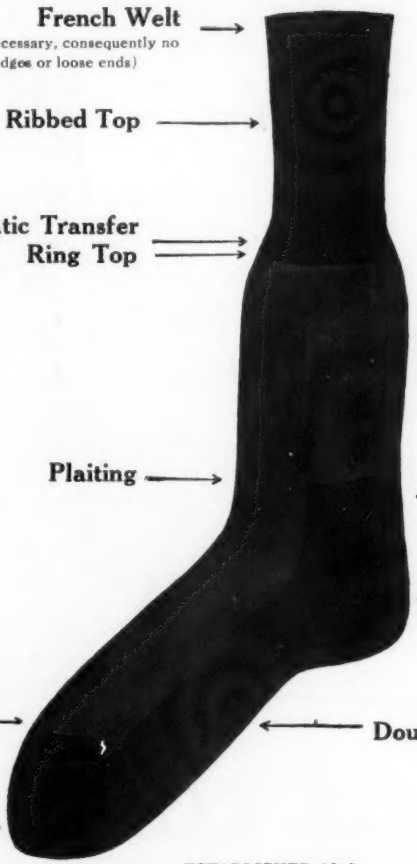

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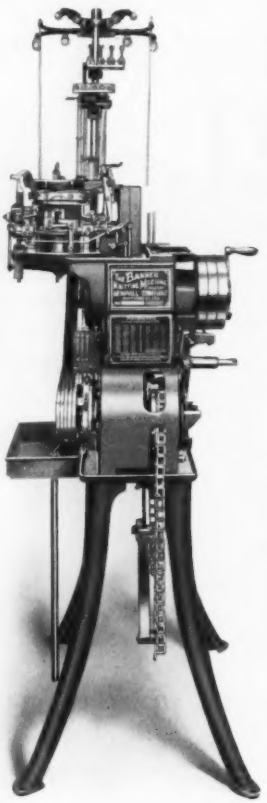

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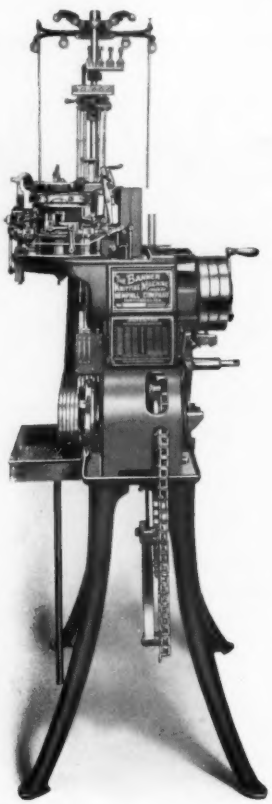
Split-Foot
Machines



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The Rib Machine

BY WILLIAM DAVIS, M. A.

Along with the machine for making hose is usually run a machine for making the ribs which are attached to the extremities of the articles. In manufacturing hosiery for full-grown persons the rib tops on plain hosiery are often dispensed with and in its place we have usually the turned over welt at the extremity, which consists of working a few extra inches of material and folding it over two-ply in the article. Until recently this used to be done separately, that is, the extra inches were worked on the same length as the leg and the piece afterwards turned over and linked together or seamed down on a separate machine, where the stitch had to be so constructed that the stitching thread would not show through on the face of the article and thus injure its appearance; most of the stitching was shown in the inside of the join and little or any of the thread emerged on to the surface of the fabric.

In flat knitting machines, the full length of the double

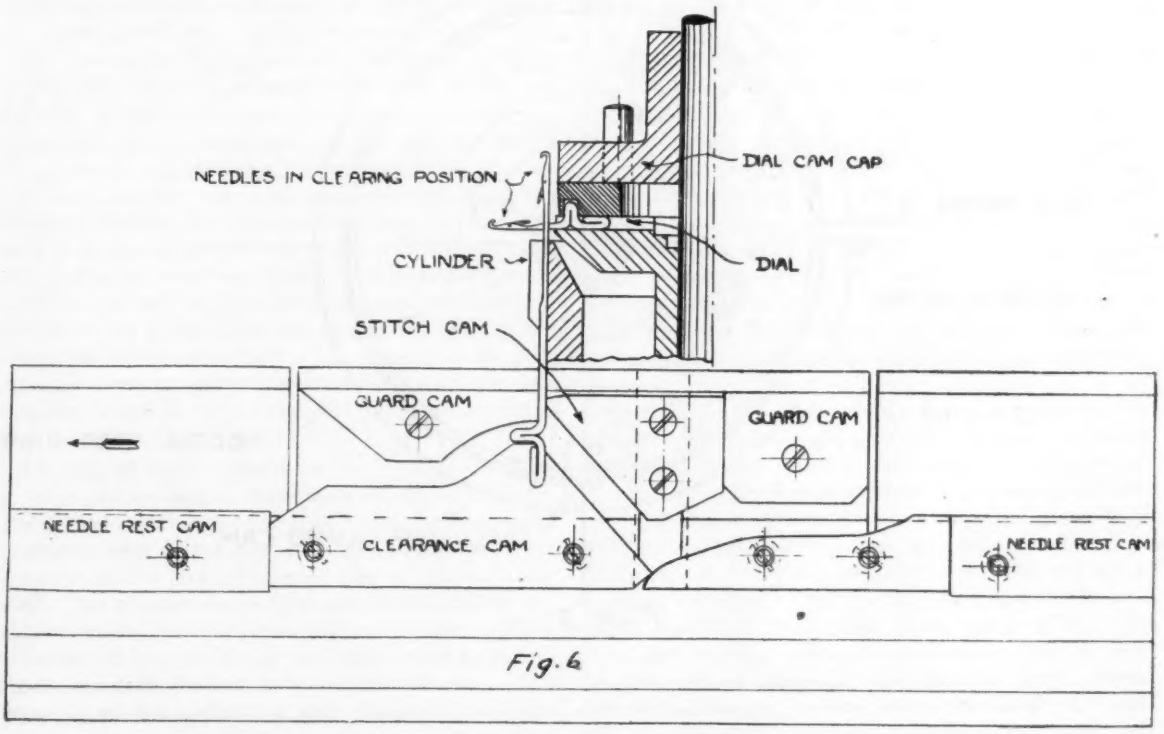


Fig. 6

welt portion is worked first and then the original row of stitches are re-transferred to the needles of the frame which makes it double and as the leg portion is simply knitted on to the top by straight forward continued knitting, no seaming is required and the second running on is expeditiously performed owing to the special construction of the setting-up bars whereby the stitches are immediately transferred from these points to the needles of the machine. The top of the hose is a most important matter on account of the extra strain to which this is subjected in drawing the stockings off and on and the double fabric is intended to withstand this strain and at the same time exert an extra grip on the leg of the wearer. In the newest automatic machines which will be described in further articles, this welt can be made on the circular automatic hose machine exactly the same as on the flat frame. The fold over and knitting continuous with the top are performed on this latest type of machine entirely automatically and a great step forward has thus been achieved in this trade, bringing it more into line with the full-fashioned branch. This machine also can insert imitation fashionings at the calf of the leg towards the ankle to give the appearance of full-fashioned goods. This is surely a case of imitation being the sincerest form of flattery and is a tribute, though a roundabout one, to the qualities of the full-fashioned article of hose. From the point of view of strict business ethics the proceeding is a little doubtful, but on the other hand it has enabled the makers of those machines to tap a new field of manufacturing activity.

The extra strain and wear and tear on the top of the stocking, or sock as it is more generally called, is much greater in the case of children's wear than that of the adult and the ordinary form of fold-over top is less used than the positive rib stitch. For this purpose we often have children's hose machines supplied to the trade in pairs, one to make the leg, heel, toe and foot, and the other machine to produce the ribbed pieces for the tops. This case requires a gauge of rib adapted to the gauge of the machine which it is intended to suit and Fig. 6, which is largely self-explanatory, outlines the general principles of structure.

In this machine we have two sets of needles one arranged vertically in the machine and the second set ar-

ranged radially in the dial, working at right angles to the vertical needles. The relation of both these sets of needles may be plainly seen from the sketch, Fig.6, where the vertical needle is shown quite plainly with its heel or butt in the path of the knitting cams and its head and latch in the position just prior to receiving a fresh supply of thread. The dial needle is much shorter in length and is noted to be placed at right angles to the vertical cylinder needle.

In the dial there are two adjustments which have an important bearing on the kind of fabric produced, one is the outthrow of the dial cam to receive its proper proportion of thread as compared with the up-and-down movement of the cylinder needles. The second adjustment of the dial is in having its needles enter the spaces of the vertical needles exactly in their centers so that equal yarn space is left on each side of the needle. This is a matter which affects the whole dial and the adjustment should be such as will give absolute trueness of working in this respect. This is all the more important as the yarn employed for this work is fed into such a position that the dial and cylinder needles have an equal claim on it and if these needles are not set to obtain absolutely equal shares of the proffered yarn, irregular fabric will result.

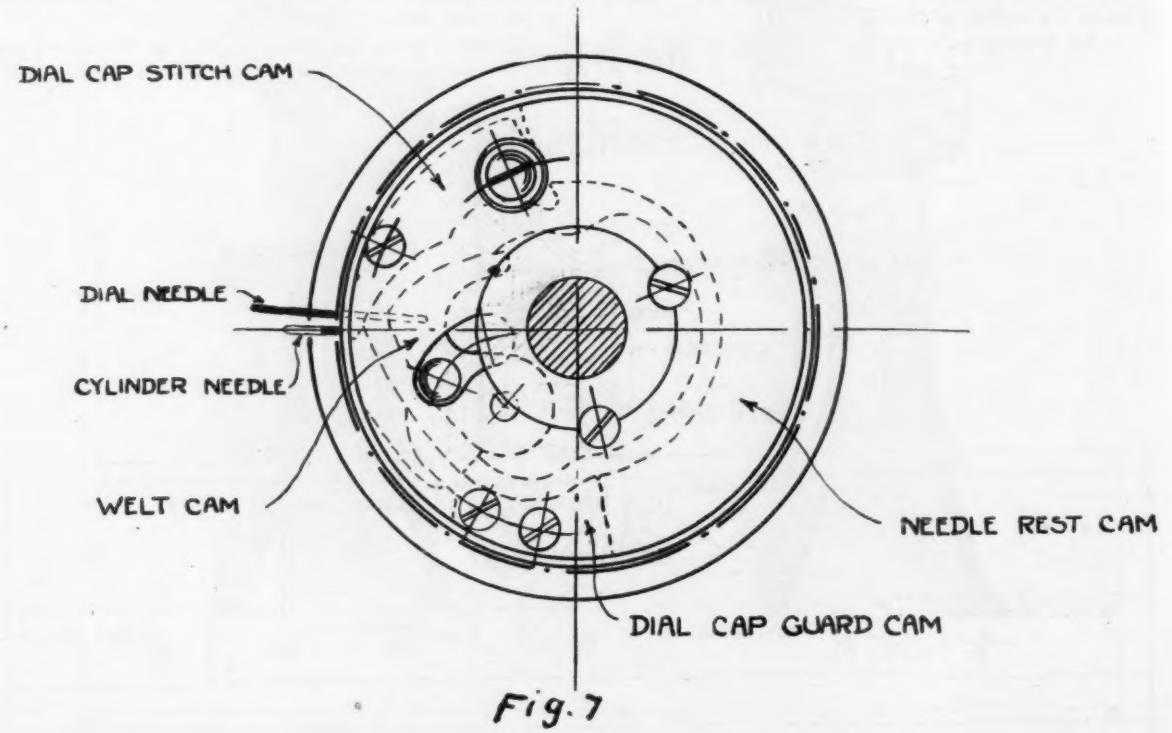


Fig. 7

Knitting Action.

The knitting action in this machine is of the simplest possible character and Fig. 6 will afford a clear idea of the cams employed for giving the needles of the cylinder their up-and-down knitting motion. It should be explained that the cams in this machine revolve and the needles are stationary except for their up-and-down knitting action, so that the rib fabric comes down the inside of the machine and does not swing round as is the case in machines where the needles revolve. In Fig. 6 the arrow shows the direction of motion of the cam box to be towards the left and when the needles are at rest in an inoperative position, their butts lean on the needle rest cams of the machine which extend right around the circumference except at the point where the knitting action is affected.

The first cam to approach the needle butts after the rest cam is the clearance cam shown, which, as will be evident from the shape, gives the needle an upward sweep and this has the effect of clearing the old stitch from the hook of the needle and making it rest down on the needle stems below the latch. On the right, the clearing cam is seen to have a decided upwards direction of its surface and this is to give the needles the higher thrust necessary for them to come into command of the thread offered by the thread carrier and this can only be done when the needles requiring to knit are raised pointedly above the general level of the needles. When the yarn has been obtained, the edge of the stitch cam shown comes into contact with their butts and this has the effect of knitting the loops of the stitches; it draws the needle downward and at the lowest extremity of the stitch cam the discharge of the loops over the needle ends is complete and the old stitch has been added to the general body of the fabric.

When this has been done, the needles pass along with definite action except that they receive a slightly higher motion from the upthrow cam shown just under the guard cam and the needles are then on the level of the needle cam at which level they remain until the cams return to them to knit for the next revolution. There are two guard cams in this set and as the name suggests their function is to act as guards for the needle butts as they ride along the surface of the cams and their function is to ensure that the needles are kept in their correct path in the machine; needles which from any cause rise slightly higher than their neighbors are at once brought into contact with the under surface of the guard cams and kept in the proper

groove.

The exact construction of the dial cams, that is the cams which work the needles in the upper cylinder which contains the rib needles may be learned from an examination of Fig. 7, which is a diagram of the chief functional parts of the particular machine being described. The various cam sections are indicated by the words and the sketch shows a view of the dial as seen from above where the dial needle is shown projecting over the edge, while the corresponding cylinder needle is given close to it.

The general configuration of the path followed by the needle butts in stitch formation is shown in the center of the sketch, Fig. 7, the idle or normal position of the needles being indicated by the needle rest cam which is uniform in circumference until the point where the needles are pushed out to form their stitches. There is a cam in the dial for pushing out the needles, but owing to the peculiar features of the dial principle of knitting, the needle butts have to be kept strictly to their path of motion and this is done by using what is termed the dial cap guard cam which ensures that the movement of the needles outward is strictly limited to the form shown. There is also indicated the dial cap stitch cam which takes its part in pushing out the needles to form the stitch in the machine.

The principle of making a round of loops may be learned by considering the cams moving in the same direction as those of the cylinder, namely, the same direction as the hands of a clock or clockwise. In this way the needles are at rest in the bottom right hand quadrant, the top right hand quadrant and at the commencement of the top left-hand quadrant the dotted configuration of the cams shows that the needles will be pushed outward to receive their portion of the offered thread. They are then drawn inwards by the cam trick and discharge their loops towards the end of the bottom left-hand quadrant. Thus it will be seen the process of knitting is carried on by a combination of cams which together give the dotted path shown and a primary function is to keep the needles from falling from the bed during knitting.

The basis of the rib stitch is the two directions in which the loops are discharged, those made on the upright cylinder needles are discharged inwards to the machine, whilst the stitches made on the dial or rib needles are discharged outwards and this gives alternating rows of stitches in the fabric. The cylinder needles give right fabric stitches and the dial needles produce wrong-side fabric stitches, this alternation of direction giving the hollow effect to the rib portions where the back stitches are produced.

The remaining cam on the sketch which may be distinguished is marked the welt cam and this performs the very important duty of making provision for the edge of the knitted article in the form of a perfect welt. It is made by working several courses of stitches on the upright needles only, during which time the needles in the rib dial are quiescent and no knitting takes place on them, the stitches being merely held in the needle hooks until these half a dozen courses are completed. It may be asked, why are those stitches held during the process of knitting the few courses, and the answer is that the back stitches have a most important part to play in the welt as they provide its foundation and the plain knitted stitches are made to curve round the extreme edge of the article so as to make it smooth; when the welt is completed the ordinary cams are again put into work and the rib portion commenced. The welt cam therefore is located in the dial and has the effect of keeping the needles inwards during the knitting for the said courses so that no stitches are formed on the dial set of needles. The welt cam takes its place in making the stitch for ordinary knitting, but when producing the welt, it is drawn out of action and remains inoperative, thus allowing the stitches which are worked on the cylinder needles to form their rows of stitches and curve gracefully round to give a perfect edge to the article.

The ribbed pieces are made usually about 4 inches long and the welt occurs between each separate rib made and they are afterwards transferred to the quill ring of the automatic hose machine and from the points of the quill ring the stitches in the circle of the rib are quickly transferred to the needles of the machine; when one hose is completed and the machine is made ready to commence another. In practice it is usual to have a young worker called a "runner-on" whose sole work is to pass the stitches of the rib tops on to the points of the quill ring and so as to have these in readiness for the machine operator when a hose is finished; the stitches on points of the quill ring are placed directly above the needles of the machine and the stitches of the rib top rapidly transferred from the points to the needles by a sliding motion.

Each machine has usually a spare quill ring which is filled and placed in readiness and in this way one runner-on may serve several machines. In some cases, the machine operator has to push the rib stitches onto the quill rings as the machine is working the leg and foot, but in most cases it is found to give better results in production to have special workers for running-on alone, preferably beginners whose fingers are still nimble and capable of being trained to perform the work quickly. Elastic ribbed pieces are a great asset to a superior article and buyers always test the rib tops of hosiery very carefully, to ascertain their status in regard to elasticity and stretch. In some cases cotton goods are subjected to a kind of modified mercerizing process when in the knitted state the effect of which is to give increased luster to the article and enhance its appearance. In this treatment the cotton fiber walls are swelled and the effect is to cause the article to shrink so that the reserve elasticity of material and stitch is greatly impaired. This may be passed over in the case of the ground of the knitted article, but it affects the ribbed portions also, reducing their necessary elasticity and this is a serious drawback to this kind of finish. It is difficult to know what to do to restore the elasticity to those ribbed portions, for any treatment would have to be applied to the garment as a whole which could not be done without annulling the very property which it had been the aim of the process to obtain.

[This is the third of a series of articles on knitting mechanism. The fourth will appear in an early issue.]

A leaflet just issued by the Allis-Chalmers Manufacturing Co., Milwaukee, Wis., describes and illustrates their spinning frame motors, which are arranged in a number of different ways adaptable to any form of drive best suited for the installation requirements. The pamphlet shows views of installations on direct connection; chain and belt drive; and on one, two and four frame drives.

The Knit Goods Market

Some of the ground gained by the knit goods market in December and January was lost in February, with prospects by the middle of the month, however, that a resumption of buying in a general way was not far distant. Jobbers were scared even before the labor outbreak in New England textile mills, which served to furnish ground for continued hesitancy. Promise of improvement was founded on the knowledge that jobbers must buy goods to enable them to continue in business; that they are out of stock, and that the bulk of what must go over the retail counters between now and fall has not been bought by distributors. Assuming that jobbers deferred their commitments for another month and bought, say, 75 per cent of what ordinarily may be expected to be needed for supplying consumer requirements, it was pointed out that, except as to staples, of which stocks are supposed to have accumulated in a few mills, there could not be produced enough goods to go around, within the period left to manufacturers, this applying with about equal force to hosiery and for underwear for next winter.

It had been apparent for some time that jobbers really wanted to buy hosiery and underwear. They foresaw a tight situation at mills if they deferred and realized prices might move up on sudden demand in a practically bare market. The excuse for inactivity was dissatisfaction with prices. But, as the buyer of a leading western jobbing house put it, "We would rather be caught with not enough merchandise in a strong market than too much in a stagnated one; we prefer to take chances on higher prices to risking the possibility of stocks of what we feel are high priced goods in a declining market."

Back of it all was the retailer credit situation. Many jobbers can show a considerable number of unpaid retailer invoices. One spoke of having promissory notes of retailers for more than $100,000 which should have been taken care of in 1921. Jobbers are not inclined to buy for the anticipated needs of customers who closed last year far in arrears, and usually when new accounts are offered financial statements must be submitted before the opening of such accounts will be considered.

In view of the exorbitant profits which were taken down by the rank and file retailers it is inconceivable to some interests that there should be this delinquency in settlement of invoices. A retailer in New York was having a margin of almost $1.75 a pair on clocked full fashioned half hose which he was selling at $4.25. Another dealer in Gotham confessed to a cold 200 per cent profit on a line of mercerized half hose. He is known to have paid $3 a dozen to a jobber who bought them for $2.40. The person who had sold the stockings to the jobber recognized them on the retailer's shelf. "What's the price?" he inquired. "Fifty cents; just reduced from 75," was the dealer's reply. He was getting away with 100 per cent at the markdown, and prior to that, according to his statement, got away with 200.

An extensive operator in southern hosiery attributed the early February knit goods market dullness to what he termed unnecessarily high prices of yarn and extortionate prices in many retail stores. High prices of commodities supply a large part of the argument advanced by labor striking against wage reductions, and probably are at the bottom of the refusal of the jobbing trade to do business as it would like to.

But market values in relation to prices are not measured by all interests with the same stick. Certain lines of hosiery, for illustration, will command more than its known intrinsic value, while others are not wanted even when offered at less than the cost of material and labor involved in their production. It ought to be apparent to any casual observer that as a broad proposition the public will buy what it wants, or approves, and will pay the price.

But it frequently happens that there is an inequitable distribution of demand for identical lines. One manufacturer may have established a reputation, by pursuing some given policy, whereby he retains a profitable clientele, while another, putting out an equally meritorious product, is lacking in some one or more element essential to successful merchandising. Two mills in Philadelphia, one with 100 spring needle machines, the other with only a few of latch needle, are making standard silk boot seamless hosiery. The spring needle mill is busy, and could sell twice its production. The other cannot sell one-half of what it is equipped to produce. In this instance it appears there is a preference for hosiery made on spring needle machines. The busy mill always has sold direct, eliminating selling agents and commission houses, and thus enjoys closer relations with the distributors of its products.

Philadelphia hosiery mills are operating less than 70 per cent of their machinery; a few are using every machine and are short of good operatives. Some mills are partly idle; some others are advertising for help. Those adhering to combed and carded staples are having the smaller end of the business; those which have discarded the one time commonplace and turned to innovations have a grip on the bigger end.

A mill which had a reputation for its carded and combed ribs for misses gave up their making last year, and is specializing in misses' combed of high grade, selling at better than $3 a dozen to jobbers. Among other lines of this mill are mercerized half hose of considerably better quality than the average. Its orders are running about 30 days ahead of production. This is one of the minority number of mills with which conditions may be said to be quite satisfactory, except as to price, for it is admitted by the management that it is operating on a very narrow margin of profit.

Another mill which found misses' ribs unprofitable and no longer is making them, has turned to infants' fancy top socks and misses' roll top mercerized ribs, and is well supplied with orders. Then there is a mill where high grade silk hosiery in heather for ladies is made, and there, too, business is reported satisfactory. On the other hand, a mill making ladies' stockings of tram and artificial silk in combination some days ago suffered cancellation of a fairly large order understood to be for export.

Early in February, when probably the depths of the year's depression was witnessed, there was some little cancellation of wool hosiery orders which had been placed in December, when pretty nearly every dealer who could present a satisfactory financial statement was buying, too

heavily, many manufacturers thought. But when the February government auction sale of wool showed an advance of 25 per cent over prices obtained at the January sale there was a reinstatement of some of the cancelled orders and dealers with commitments for fall began to breathe easier.

The wool yarn situation seems to have put a check on the contemplated increase in the production of hosiery of wool and mixtures. Desirable yarns for satisfactory deliveries have not been easy of acquisition. Some spinners are sold ahead as far as they are willing for the time to operate, and few of the better known are encouraging buyers. Spinners long of wool and manufacturers long of yarn are in a very strong competitive position in relation to wool goods for next winter. One mill owns worsted yarn at $1.90 and has sold hosiery on that basis. The identical yarn now is held at $2.80, and offers of $2.65 have been rejected by spinners.

It will not be hurtful to mills well established in the wool and heather lines if circumstances deter some interests planning to engage in them, and may be in the best interests of the latter. A few years ago it was pointed out in this correspondence that there was a probability the production of certain very low price carded hose shortly would be overdone. It was, to the serious loss of not a few manufacturers who even now are not fully recovered. With practically every mill abandoning staples as a product there is one more to swell the output of wool, heathers and novelties of a hundred varieties. Such lines seem good for this year, but the fear of overproduction, which lurks in the mind of many jobbers, was a factor in the recent cancellations and explains why they are deferring their commitments. Too much of any commodity will force it to a lower price level, regardless of what may have been the cost. It was too little of wool and heathers that last year sent prices to high levels. The established mills obviously would possess an advantage over those with which the novelties still are somewhat an experiment, were there a suspicion of excess production, and that has germinated.

The enormous capital required to finance a mill making wool and heather hosiery for deliveries four to six months in the future was not contemplated when first the fever became epidemic. As this became apparent, some well laid plans were hastily given up. Whether the manufacturer or the jobber provides the capital for carrying such goods makes little difference. Provision has got to be made for it, and as mills, under present market conditions, are seeking to escape so far as possible the risk of carrying goods for distributors, more of the burden than ordinarily falls on the latter.

A small jobber rated "Good" may easily exhaust his line of credit in his purchases of wool hosiery alone. Mills may have been extending him, say, $15,000 credit. A wool and heather hosiery contract alone, if he buy anything like assortments, would involve him for, say, $25,000. The seller would not be likely to grant him credit for that amount, and he, therefore, must arrange for the capital or be content with incomplete assortments. In a case in point, a jobber's contract would have committed him for $23,000; his line of credit was $15,000 and the manufacturer declined to extend it. He was willing to ship in installments, deliveries to begin at once and each to be paid for by the time the next shipment fell due. This would have imposed on the buyer the burden of carrying a large part of the goods, which he did not want until July. The best he could do was cut his order to conform to his line of credit and depend on filling in later in the year.

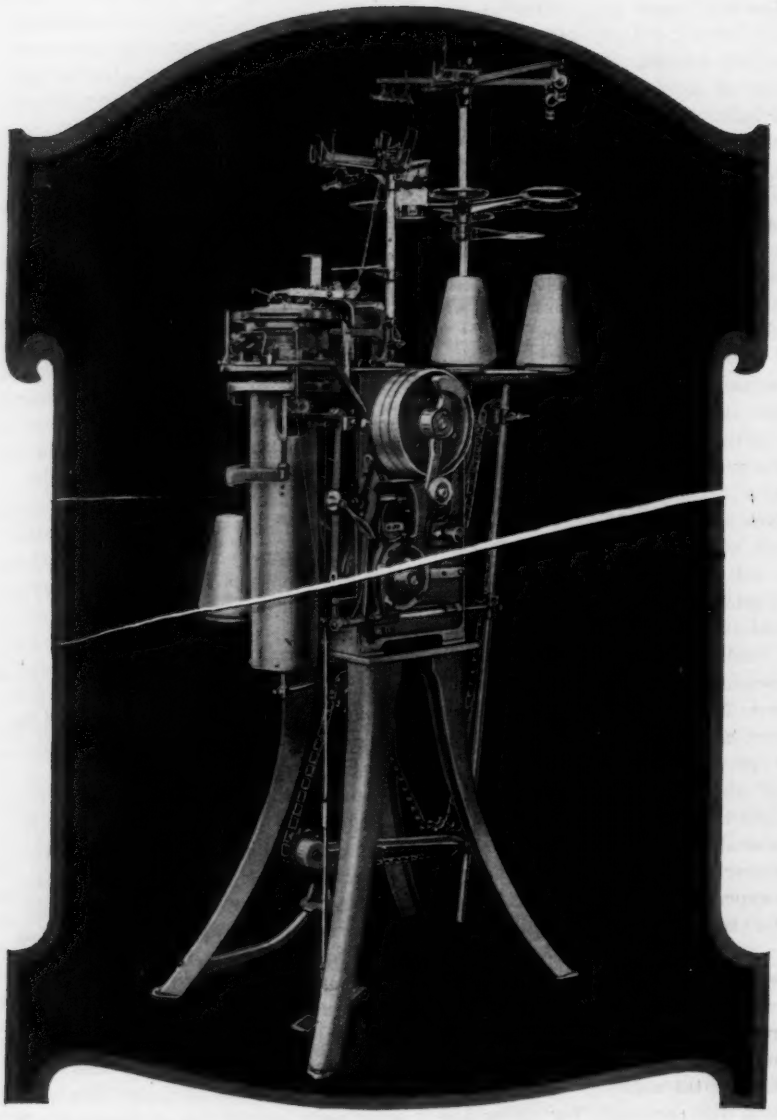
The same illustration applies of course to silk hosiery, and the tightening by sellers really is nothing more than a development of changed credit conditions. Last year's contracts for silk hosiery for the current season were placed mainly by the financially stronger jobbers, and even some of these got less than they wanted, which from their viewpoint is unfortunate, as silk prices then were lower than they now are or are likely to be this year.

Some interests have believed or affected to believe that this year there would be full fashioned silk hosiery in abundance, taking into consideration the extensive additions to equipment in the last twelve months and steady production in sixteen of the larger mills which last year lost a full seven months' production by reason of strikes. Then comes the doubling of the capacity of the Berkshire Knitting Mills, in Reading, which is practically duplicating its large plant, with every machine in operation. However, there would seem no likelihood of an excess production of full fashioned hosiery this year. In the first place, the mills which last year were idle and formerly operated 54 hours per week now are running only 48, with many of the machines manned by only partly trained knitters. These have become skilled but have not acquired speed. The strikers who resumed their places, working now side by side with non-union knitters, are not getting off their former maximum output, discontent with having lost the strike leaving them quite indifferent and still disposed to so restrict effort so as to provide jobs for more union knitters.

Going further, some of the comparatively new full fashioned mills are not getting off the full possible production, and those not financially strong refrained from pushing operations while raw silk was moving to higher levels. They realized they had to reckon with these mills which, idle last year, carried over low price raw material, both silk and mercerized yarn. Production has been held in check for more reasons than one, and meanwhile full fashioned, or, to be more accurate, tailored, hosiery has been gaining in popularity, so that its consumption this year doubtless will be greater than in any previous year. Wool hosiery perpetuated the short skirt and low shoe for winter and it seems quite certain this combination will prevail throughout this year, with silk hosiery in more variation as to stitch and color effect.

That woman—physician at Vassar College—who in a recent address in Poughkeepsie, N. Y., spoke in favor of "freedom of the knees" as being as desirable as "freedom of the seas," and advocated continued wearing of short skirts, and that western woman who is a director of the World and the National Women's Christian Temperance Unions, who said it was natural that girls want to wear short skirts; that such skirts are hygienic and that girls are healthier than formerly, may be rated as benefactors, from the viewpoint of manufacturers of tailored silk hosiery, and what they said will not be disputed by many well dressed and otherwise attracive women.

Another benefactoress, if her departure prove infectious, is the Atlantic City, N. J., woman who several weeks ago appeared on the broadwalk wearing two pairs of hosiery, the outer stocking of silk, and that next to the skin



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of light weight worsted of nude shade. Her explanation for what critics may say was nothing more than a freakish notion was that she wanted the warmth of wool and the dressiness of silk. With the silk of black over the worsted of nude it was not apparent to casual observers that she was wearing two pairs where formerly one served.

The idea was expanded by a woman who wears a vivid cerese seamless silk under one of black of very gauzy fabric, the result being not unlike a heather mixture effect. She also wore a black silk over a heather in which green was the background. Thus, with three pairs of stockings she is able to indulge her vanity to the extent of five complete adaptations—she can wear either color singly or the silk over either of the two others. The hand that rocks the cradle is making a bigger market for silk hosiery. But the hand that guides the plow is not doing much for the mill that makes combed and carded hosiery.

Manufacturers of and wholesale dealers in what a few years ago were hosiery staples have not been getting their fair proportion of the restricted volume of business. Their better market, the agricultural sections, is partly closed by the depression among farmers. Another normally good outlet is choked by abnormal unemployment; and the urban population not affected by crippled industry is running strong to fancies and novelties in any number of fabric combinations. Probably a normal number of dozens of hosiery, allowing for the economic situation, is being produced, but production as a whole is sadly out of balance.

In the very order of things, there should develop shortly an improved market for commonplace hosiery. Output has been much curtailed and, except as to comparatively few mills, stocks have about been absorbed. There has been only light buying, and much remains to be done. Holders in position to keep goods in warehouse a little while longer should be able to obtain sufficiently higher prices to recompense them for their patience and capital investment. It costs six per cent to carry stock, to say nothing of the risk. In whatever manner jobbers operate, so should manufacturers operate now, is the thought of both mill heads and many selling agents. The "tomorrow" of the distributor, it appears, ought to be a "tomorrow" for the manufacturer.

The really quiet quarter of the knit goods market has been that devoted to underwear. Some of the commission houses say they cannot recall so prolonged a period of jobber inactivity as that which prevailed following the beginning of the year. The depression extended even to the mills making low end cotton ribbed goods which for several months were selling freely. Two of the Tennessee mills booked a very large business before the end of last year. They waited for no formal opening, offering their lines when they believed buyers were ready to operate. At this writing it seems they caught the market opportunely. Had they waited for the northern mills making what are styled standard garments they undoubtedly would be feeling the effect of the recent stagnation no less than the others.

The P. H. Hanes Knitting Company at Winston-Salem, N. C., did not name prices until well after January 1. In this instance deferred opening appears to have been well timed, for the company has sold freely. In fact, the bookings for a given period were largely in excess of those for a like period immediately following the opening for last Fall, and it is stated by several jobbers that their orders this year are for more dozens than they bought in their initial transactions in 1921.

Two of the New York State mills also making cotton ribbed suits and separate garments are quite well supplied with business. One of these got into the market ahead of most of its competitors, basing prices on a contemplated wage reduction, which subsequently went into effect. The other of the two Mohawk Valley mills referred to came later and the executive states that its business is quite satisfactory. An Ohio mill making distinctive types of men's union suits only began booking business late last year and has sold the greater part of the season's production.

Fleeced underwear has not been attracting its share of attention, the business in this line also being confined to a few mills. At least two mills making boys' winter underwear are closed, not for want of business, but because goods were bought for deliveries in July and later and the manufacturers are willing to carry them so long. Both of these mills have been soliciting business from manufacturers willing to supply yarn, and have had some offered to them.

Among commission houses complaint has been heard of a few manufacturers inaugurating a price cutting campaign. This may have coaxed a modicum of business from a few small buyers, but the probability is that as a whole more business was lost than gained through the policy of undertaking to get below the prices of a competitor. "We shall meet the prices of any competitor, no matter how low," said the executive of an establishment selling the product of a number of mills. "It's bad business, but if others can stand it I guess our mills can. If it shall be carried far enough somebody will be reckoning losses instead of the profits that were estimated would be made when too high prices were named. My group of mills would prefer to not operate except at a profit. Others have forced us to operate against our best judgment."

It was the opinion of manufacturers who ignored the price cutting that those who engaged in it would abandon the policy so soon as they realized the extent of their prospective losses and that then the market would show some measure of stability.

Speaking generally, business in ladies' winter underwear has run ahead of that in men's, but still has been disappointing. One mill, the executive says, has sold its entire production, and it is understood the Augusta Knitting Mills, Utica, N. Y., has been faring better than most mills.

A southern mill is understood to have booked an unusual volume of business in 14-pound cotton ribbed union suits which, in view of the lower price and the willingness of jobbers to take out of weight what cannot be taken out of price, is believed to have cut into the sales of the 16-pound suits of several low end mills. The low prices put on the 14-pound suits were for deliveries beginning early in the first quarter of the year, the concession making early deliveries attractive to jobbers well situated financially.

Several mills received repeat orders for spring underwear in advance of the start of the duplicate buying season. The impression prevails that, while jobbers in the main bought pretty well up last year, when prices were based on cotton at and around 14 cents, there will be a considerable turnover of goods yet to be contracted for. The Pennsylvania light weight mills as a class have been

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steadily engaged since last fall and have not yet caught up with sales. Some of the mills could use more operatives. These appear scarce in the smaller towns of the Schuylkill Valley where many underwear mills are clustered.

Activity in the light weight mills in Pennsylvania is not being reflected in the cotton yarn market, for, it seems, the manufacturers bought quite heavily following the spurt which had its beginning early last fall. Sellers report very little underwear yarn moving. Some of the yarn merchants bought in expectation of an active January, and were found selling in a slow February. Sales from stock, frequently at a loss, have had a depressing effect on the trade between manufacturers and spinners.

A somewhat complex market situation has existed due to declines in silk and cotton yarns and advances in wool, artificial silk so scarce an upward price revision for that fiber was feared—and jobbers complaining that, at even lower values, prices were not satisfactory. There is a strong demand for artificial silk of 150 deniers for the sweater trade, in which spring and summer business has been brisk, while orders for winter garments are being withheld.

It is variously estimated in the primary market that not more than 10 to 15 per cent of the sweaters for winter have been bought. While buyers were resisting prices, values moved up by about five per cent. This had the effect of putting emphasis on dullness in an already dull market. Men's sweaters have been bought more freely than women's. Styles are more stable. It is a custom of some manufacturers to come out late with novelties in women's sweaters—so late that competitors cannot get on the market with copies. Distributors who buy early are in constant dread of innovations later in the season.

As in hosiery and underwear, business in sweaters has not been equitably distributed. Some few mills are idle; many are operating at only a per centum of capacity, and a few are sold far ahead. One mill has invoiced buyers for samples amounting to a trifle over $25,000, and therefore may be viewed as having taken a nice volume of business.

Sweaters for summer, in which a number of new and fetching shapes and colors and stitches are shown, have kept leading mills well employed. An appealing blue from one mill is described as a Rolls Royce shade. Some of the niftiest of silk sweaters can be sold profitably over the retail counter at about $13, and equally striking worsted garments will be available at around $7.50 to $9.50. Some of the southern retailers who have shown summer sweaters from one important mill predict an enormous sale. Designers appear to have brought out distinct and appealing numbers, judging from the comment heard in retail stores.

Bathing suits have had a big season, and some buying has been done since prices of worsted suits were advanced 20 per cent several weeks ago. Many of the new bathing suits are made in four colors—stripes of three shades on a solid body. One suit of green and black only will cost lady bathers $18.

The Stafford Company, Readville, Mass., manufacturers of weaving machinery, have issued a bulletin descriptive of parts and fittings for their dobby looms, showing plates of parts, numbered and keyed by reference to which repair parts can be readily identified and ordered by name and number.

Among The Knitting Mills.

Coincident with the announcement that their capital stock had been increased from $300,000 to $500,000, the Kingsport Hosiery Mills, Kingsport, Tenn., made public plans for the establishment of five branch factories in East Tennessee, employing between 30 and 40 persons each, to turn out unfinished products which will be shipped to the central plant at Kingsport for finishing. The production of the mills will be increased to about 2,000 dozen pairs of hosiery a day, it is stated. C. D. Gott, secretary and manager of the mills, will have the general management of all the plants, with superintendents in charge of each separate branch. Suitable buildings will be erected and about 250 knitting machines will be installed for this work.

The Consolidated Mills Company, of High Point, N. C., has filed articles of incorporation. The total authorized capital stock is $100,000, and the organizers are J. H. Adams, J. A. Millis, R. O. Lindsey and J. W. Lindsey, all of High Point. The charter gives the corporation authority to buy, manufacture and sell hosiery, underwear and knit goods of silk, cotton, wool and other fibers and any mixtures thereof, etc.

It is stated that the Mitchell and Frank Knitting Mills, Inc., Buffalo, N. Y., have started capacity production in their new plant at that place. The company manufactures sweaters, and has an initial equipment of 30 knitting machines employing 75 operatives.

William Gordon, Nixon, Texas, is contemplating the establishment of a knitting mill at that place, it is stated.

Construction work is well under way on the new knitting mill plant of the Interwoven Mills, Inc., at Hagerstown, Md. The plant will be one-story, 80x165 feet, and will be operated as a branch of the Martinsburg (W. Va.) plant.

The floor space of the Lowell, Mass., branch of the Hub Hosiery Mills, Inc., Boston, Mass., has been doubled and new machinery installed. The concern manufactures infants' silk, cotton and wool mixture hosiery.

The Graceline Knitting Co., Linfield, Pa., is completing the erection of a new brick building, two stories, 40x80 feet, and will install ten additional knitting machines for operation on women's cotton ribbed underwear. This will increase their equipment to 33 knitters.

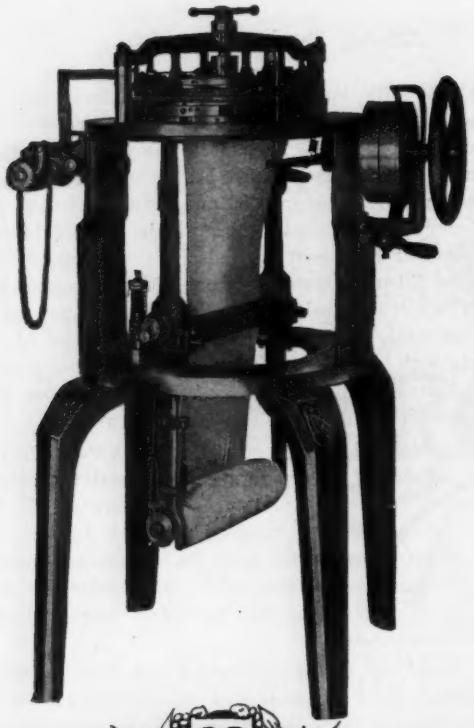
George C. Hix, Newmanstown, Pa., has bought out the Lebanon Valley Knitting Mill, Inc., and has installed six new Merrow sewing machines.

The Taubel-Scott-Kitzmiller Co., of New York, is reported to have under contemplation the erection of a branch knitting mill at Lafollette, Tenn.

L. S. Baker, North Carver, Mass., is completing details for establishing a small plant for the manufacture of lisle and mercerized hosiery.

The Lincoln Knit Goods Corp., St. Louis, Mo., has been incorporated and is now making arrangements for the establishment of a mill to manufacture sweaters, bathing suits, jerseys and sport coats. Production of goods will begin about May 1, it is expected. The plans call for 125 knitting machines and 65 sewing machines. Complete equipment for skein dyeing will be installed.

Lockton & Birkman, Philadelphia, Pa., has been organized for the manufacture of fine hosiery. Fred Lockton, for many years connected with the Wildman Manufactur-



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We claim for our machines simplicity, correct principles of construction, durability and excellence of workmanship.

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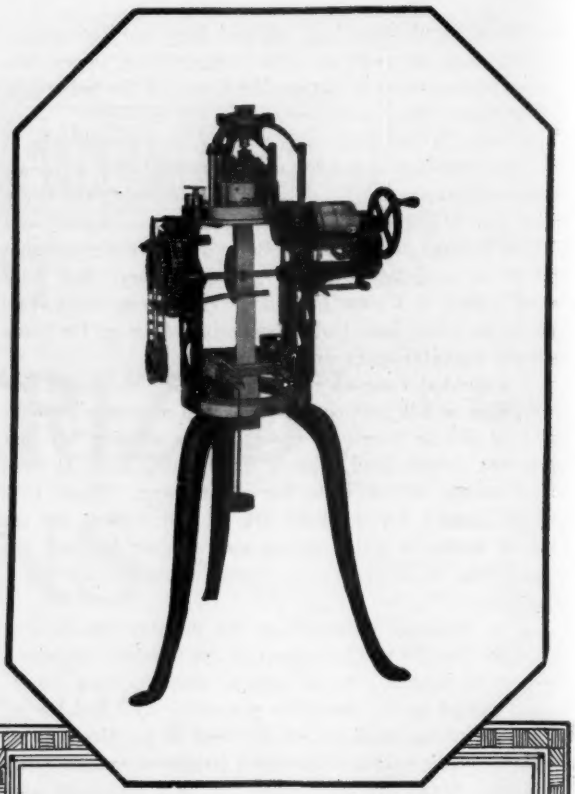

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possess all modern improvements, including selvage welt, French welt, double knee, dogless and stripping attachments, with automatic stop motions.

Built in all sizes, for all classes of rib work.

We also build hosiery knitters and Body machines for underwear and various other circular machines for all kinds of knitted articles.

Samples and prices on request.

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Philadelphia Pennsylvania

ing Co., of Norristown, Pa., and George Birkman, are the organizers.

Joseph Wotkowicz, Adams, Mass., is starting the manufacture of ladies' heather mixture hosiery. The initial equipment includes ten knitters, two loopers, two Merrow sewing machines and one Singer machine, twelve "Philadelphia" drying forms, together with other necessary equipment.

The Ballston Spa Knit Glove Co., Inc., Ballston Spa, N. Y., has plans for the erection of a two-story plant addition, 25x46 feet, at Milton Avenue and South Street, to cost about $20,000.

Enlargements are being made to the equipment of the Hawley (Pa.) Knitting Mills, Inc., manufacturers of knit scarfs, etc., and when these are completed, their production of men's, women's and children's sweaters will be materially increased. The line will consist of fiber silk, vicuna, mohair, camel's hair, alpaca and worsteds.

The Excelsior Knitting Mills, Union, S. C., are electrifying their carding and spinning rooms. New equipment consisting of 50 General Electric motors to attach to spinning frames and twelve G-E motors for line shaft drives in the card room has been purchased. Link-Belt chain drives will be used. J. E. Sirrine & Company, of Greenville, S. C., are the engineers.

An addition of 60 knitting machines has been made by the Davenport Hosiery Mills, Chattanooga, Tenn., following an increase in their capital stock from $150,000 to $300,000.

The dyehouse of the Mountain City Knitting Mills, Chattanooga, Tenn., has been enlarged and fourteen additional Scott & Williams Model B5 knitting machines installed in the manufacturing plant.

A number of Scott &Williams New Model HH machines have been installed at the main plant of the United Hosiery Mills Co., at Chattanooga, Tenn.

The Phoenix Knitting Works, Milwaukee, Wis., are planning the erection of a large new concrete building for use as a central dyeing and finishing plant, the estimated cost of which is $400,000. Lockwood, Greene & Co., Boston and Chicago, are the engineers.

The Anchor Hosiery Mills, Philadelphia, Pa., have been chartered with a capital of $10,000 for the manufacture of hosiery and other knit goods. M. B. Podolin and Isaac Davidson, 1315 Roosevelt Boulevard, Philadelphia, head the company.

J. Miller, W. Larkin and others have organized the Organ Knitting Mills, Inc., Brooklyn, N. Y., for the manufacture of knit goods. The capital is $20,000, and the address of the representatives is 381 Livonia Ave., Brooklyn.

An expansion of facilities is proposed by the Rathbon Knitting Co., Woonsocket, R. I., who recently increased their capital stock from $100,000 to $500,000.

The Millage Corporation, 170 Fifth Avenue, New York City, has been organized to manufacture knit goods, with a capital of $50,000.

A knitting mill is to be operated by the recently organized Delmar Knitting Works, 1707 Pitkin Ave., Brooklyn, N. Y., it is reported.

H. & F. Knitting Mills, Inc., New York City, has been incorporated with a capital of $50,000 to manufacture sweaters and other knitted products. The incorporators are G. Siegel, L. Friedman and L. Goldman.

The O. K. Knitting Mill, 429 Warren St., Newark, N. J., has filed notice of organization, and plan to soon begin the manufacture of sweaters and other knit goods. The company is headed by Peter Cap.

The manufacture of hosiery and other knit goods is planned by the recently incorporated Liberty Hosiery Mills, Inc., of Utica, N. Y. The incorporators are H. W. Symonds, G. B. French and J. H. Merwin, all of Utica.

Work is progressing on the construction of the new plant of the Morris Knitting Mills, at Brooklyn, N. Y. The new building will be three-story, and is estimated to cost $50,000.

The Premier Knitting Mills, 105 Meserole Street, Brooklyn, N. Y., have increased their capital from $5,000 to $50,000, for proposed expansion.

The Hand Knitting Yarn Co., New York City, has been incorporated with a capital of $10,000. Knit goods will be manufactured. The incorporators are T. & H. Rubin and T. L. Shaffer.

The C. & K. Knitting Mills, Inc., Brooklyn, N. Y., has been organized to operate a local plant for the manufacture of knit goods. The company is headed by H. Chadkin and M. Zamer.

The Lenox Knitting Mills, a Pennsylvania corporation, has filed notice of proposal to operate in New York for the manufacture of knit goods.

An Improved Ball Bearing Hanger.

The new Skayef ball bearing hanger manufactured under the supervision of S K F Industries, Inc., is distinguished by several improved features of design. The hanger, shown in the accompanying illustration, is built

around the S K F marked self-aligning ball bearing now in extensive use with the old type hanger. The new hanger, however, uses the principle of two point suspension, carrying the bearing in a split housing which is rigidly held by two threaded suspension rods. This arrangement is designed to make a strong, compact unit, easy to assemble, locate and inspect. Any necessary vertical or horizontal adjustment can easily be made at the end of the housing by means of lock nuts and set screws provided, eliminating the possibility of applying pressure which might be transmitted to the bearing while making adjustments.

The self-aligning feature, furnished within the bearing itself, enables the shaft to turn freely at all times with a

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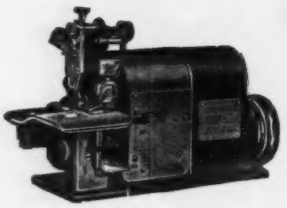

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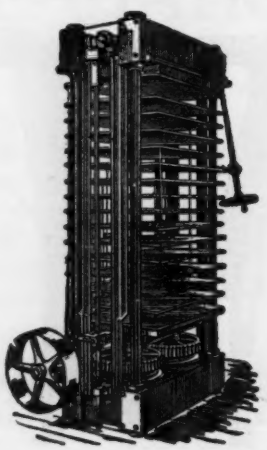

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minimum amount of friction, and prevents rubbing, heating and binding. A favorable feature advanced for the new hanger from the standpoint of the millwright is that it enables him to lay the shaft out on the floor with the bearings in plain view and then raise it into position for final adjustment with the upper half of the housing off, thus assuring a correct assembly. The manufacturers claim freedom from trouble and a large amount of power saving secured through this type of hanger make it particularly advantageous in decreasing operating cost in the average plant.

H. Brinton Company's New Plant.

The accompanying photograph shows the new manufacturing plant to be erected by H. Brinton Company, builders of automatic circular knitting machinery, Philadelphia, Pa. This plant has been designed especially for the manufacturing processes of this company, and is of the latest type of factory construction. Its location will be at Kensington Avenue and M Street, Philadelphia. The building is of concrete construction, ell shaped, 60 by 300 feet long, with the ell of the same width by 80 feet long, and is three stories high. In addition, there is a one-story machine shop, 96 by 140 feet, and a garage to accommodate six cars. The plant will be electrically operated, power being purchased from an outside company, and boilers for heating purposes only will be installed in the new building. William Steele & Sons Co., of Philadelphia, are the architects and engineers.

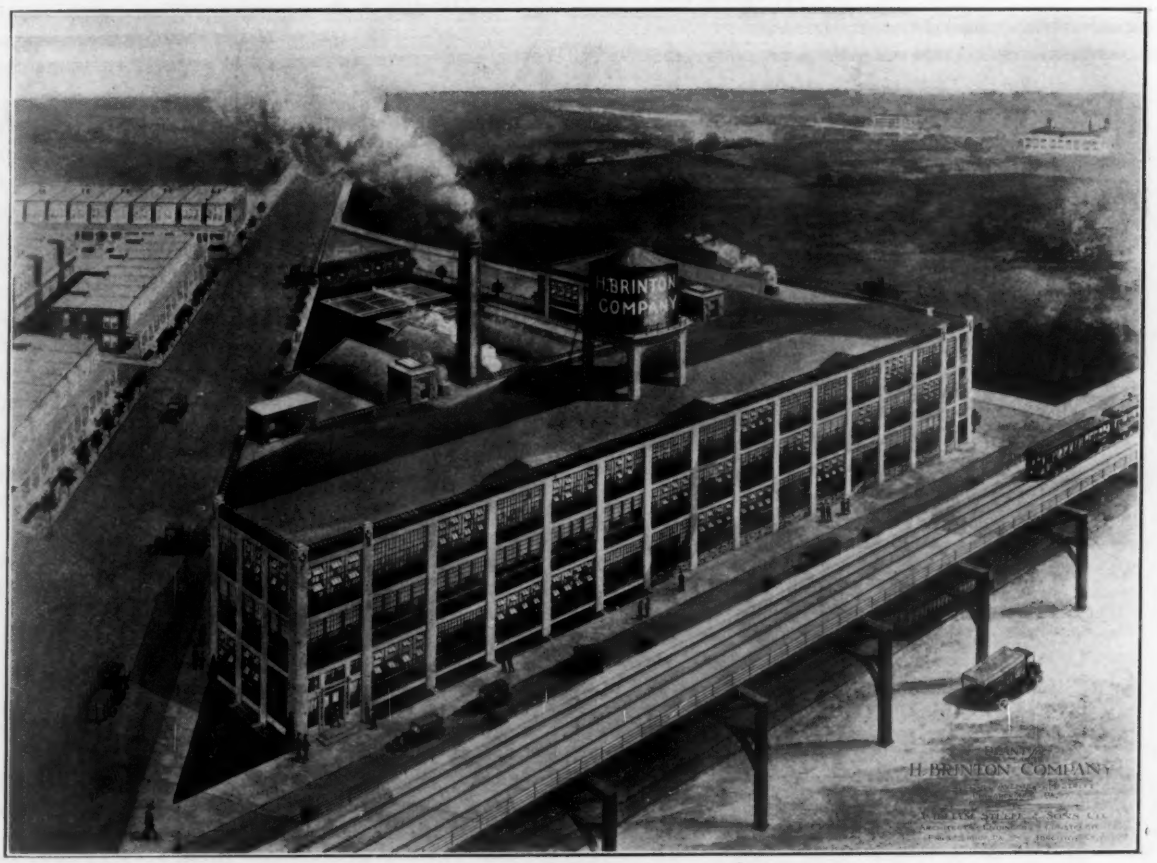
Refrigerating Machinery in Place of Ice.

Automatic refrigeration is now so efficient and so economical that the majority of textile mills are adopting this method for cooling drinking water, making pure artificial ice and to keep caustic soda and other chemicals at even temperatures before they are sent to the boxes and tanks.

The most popular use is for drinking water. It is now recognized by mill superintendents that a constant supply of cooling water, close to thirsty workers, adds tremendously to their efficiency. Iced water tanks are sometimes used, but it is readily recognized that ice is an unsatisfactory refrigerant—it varies widely in temperature, melts too quickly, requires an attendant to fill and clean the tanks.

The Lipman Refrigerator Car & Mfg. Co., of Beloit, Wis., are manufacturers of refrigerating equipment of all kinds. Their line is complete, ranging from 2-ton machines for cold storage rooms to the small device for home use. Lipman machines are built on the single, compact unit plan, and are full-automatic—absolute control being furnished by a thermostat which starts and stops the machine when the cold varies within 1½ degrees of the temperature set.

Lipman automatic units may be placed separately for large installations, saving the tremendous expense and piping of a central unit. The operating cost is small and there is little maintenance cost. Records of users of these devices in the mill industry are said to show very satisfactory savings over ice bills.



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DIXIE YARNS

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Natural and Gassed
20/2—80/2

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Our yarns are spun according to our own specifications.

LET US QUOTE YOU.

Less Time in Boiling Out Better Finish!

You can put out an improved class of goods if you let us cooperate with you. Specify conditions when writing.

Electric Smelting & Aluminum Co., Inc.
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NORFOLK, VA.

Manufacturers of

NORTH CAROLINA PINE BOX SHOOKS

The Yarn Market.

An attempt to record the course of the Philadelphia cotton yarn market during the month just past would contain no positive degree of accuracy in its result, and an effort to predict the conduct of prices in the future would be likewise useless and without a foundation sufficiently well grounded to warrant the construction of any opinion.

It was evident, however, during the period just gone that, coupled with a continued drought of business, prices in this market took a tumble, and quotations showed up much lower late in February than was their position about the middle of the preceding month. It was somewhere around mid-January that prices generally attained their most recent "peak," and from that time to the writing of this, an illustrated picture of the price quotations, a chart showing the direction followed by them, resembles either an appropriate toboggan slide, or, in other cases, a well defined descending stairway; as an example, 30s southern single warps lost something like three or four cents on the pound during this period, and the same number in two-ply skeins went from 38 cents on January 18 to 34 cents a month later.

This partial recovery of the buying end of the market to the control thereof, it is assumed, is an apparent evidence of a desire on the part of spinners and holders of yarn to get them off their hands, and a corresponding reducing of rates in an effort to accomplish this end; and an influence on the part of sagging raw cotton values is also taken into account in considering the wherefore of the decline. Last month this column announced that to all appearances, cotton yarn rates had taken a new lease on life, and to all appearances prices were putting forth an honest effort to regain ground lost previously; but experience shows that this market, in respect to its general price trend, is possessed of a very evident degree of a characteristic of inconsistency, uncertainty and changeability. Buying, as indicated, continued draggy, with no noticeable amount of trading going on. In fact, it w declared by one factor, there was not sufficient business done to accurately determine what should be an average range of prices, though the published list is accepted as being as nearly correct as possible. In this connection it might be mentioned, however, that while trading in all lines was sluggish during the month, toward the latter part of the period, some little business was transacted, notably in carded knitting yarns, which were among the first to respond to the effect of cotton values which were somewhat stronger. Generally, however, the renewed strength of the staple seemed to have little effect on yarn rates throughout the remainder of the list.

At this writing it would be difficult to determine the effect of the New England operatives' strike upon the cotton yarn market. Several opinions have been advanced, but at present there has been no definite decision made one way or the other toward the settling of the strike, and nothing definite can be surmised until the actual outcome of the walk-out is evident. Little is reported in the market other than the information contained in the daily news reports from the strike district, and, as stated, no developments have as yet been made, other than the actual closing down of the mills in Rhode Island and other textile centers of New England.

Following are price quotations on the Philadelphia cotton yarn market on February 16:

Southern Single Skeins.

4s to 8s	28	10s	28½
12s	29	14s	29½
16s	30	20s	31
24s	32½	26s	33½ @34
30s	34½ @35		

Southern Single Warps.

8s	28½	10s	29
12s	29½	14s	30
16s	31	20s	32
26s	34½	30s	35
40s	51 @53		

Carpet and Upholstery Yarn in Skeins.

8s and 9s 3-4 slack	27
8-2-4 tinged tubes	21@21½
8-3-4 hard white warp-twist	26
8-3-4 hard twist waste	21

Southern Two-Ply Skeins.

8s	27½	10s	28
12s	28½	14s	29½
16s	30	20s	31
24s	32	26s	33½
30s	34	40s	50 @53

Southern Two-Ply Warps.

8s	28½	10s	29½
12s	30	14s	30½
16s	31	20s	32 @32½
24s	33½	26s	34½ @35
30s	36	40s	51 @53

Southern Two-Ply Combed Peeler Skeins and Warps.

8s to 16s	50	20s	53
24s	54	30s	60 @65
40s	75	50s	80 @85
60s	95 @$1.00	70s	$1.05@$1.10
80s	$1.20@$1.25		

Southern Frame Spun Carded Yarn on Cones.

8s	28 @28½	10s	29
12s	29½	14s	30
16s	30½	18s	31
20s	31½	22s	32
24s	33	26s	34
30s	35 @35½	40s	51 @53
30s double carded			42 @43
30s tying-in			33½ @34

Northern Mule Spun Carded Yarn Cones.

10s	34	12s	35
14s	36	16s	37
18s	38	20s	39
24s	40	26s	42
30s	45	40s	56 @58

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	44	12s	45
14s	46	16s	47
18s	48	20s	49
22s	51	26s	53
28s	60	30s	64
36s	72	38s	73
40s	75		

"An Introduction to Jute Weaving" is the title of a book by T. Woodhouse and J. Ireland, which has just been published. The authors, who are known to COTTON'S readers as the writers of several serial articles on cloth design and manufacture, state that this book is prepared especially as a text-book for students who are preparing for examinations in jute weaving. It gives a general description of the methods of counting yarns, winding of warp and weft yarns, starch mixings, dressing of warps, and a description of the varieties of jute fabrics. It is also expected to serve as an introduction to the previous volumes concerning the weaving and cloth structural sides of the jute industry. It contains 136 pages of reading matter, and should be of value to those interested in jute weaving. The publishers are William Kidd & Sons, Whitehall St., Dundee, Scotland.

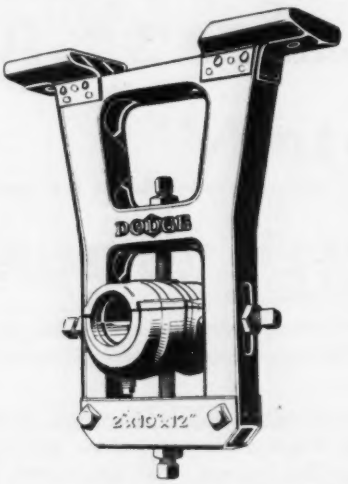
The National Bank of Commerce in New York, of New York City, have issued a book entitled "The Revenue Act of 1921," which presents the complete text of the new act under which Federal internal revenue taxes are to be levied in lieu of those imposed under the Revenue Act of 1918.

Beginning with 1922 the excess-profits tax is repealed and surtax rates are slightly reduced, says the book in its foreword. While rates imposed on income of the calendar year 1921 have not been changed, the methods prescribed for the determination of taxable income have been altered in many particulars. Among noteworthy changes are the provision of an optional tax at a limited rate on net gain

from the sale of capital assets held more than two years and the authorization of the deduction of net losses from income of subsequent years.

Side notes and a complete index are included in this book to facilitate reference to the act, and an appendix of tables illustrates the application of the rates to incomes of varying size and composition, and their effect on the net income from various classes of securities in the hands of individual investors. The bank will doubtless send copies of this book to any interested manufacturers upon application.

The Dodge Sales & Engineering Company of Mishawka, Indiana, announce that they have perfected, after two years experimentation in construction and design, a pressed steel hanger for general purpose use. In offering to power transmission users this pressed steel hanger, the Dodge organization does not unreservedly endorse steel hangers regardless of their construction for every purpose,



but they simply recognize a demand for a lineshaft hanger of lightness and strength to serve under conditions not severe or unusual and where first cost is of guiding importance. The Dodge pressed steel hanger is now available through Dodge, Oneida and Keystone dealers on an immediate delivery basis.

The U. S. Circuit Court of Appeals, Second Circuit, N. Y., rendered an opinion on February 14, 1922, affirming a decision previously handed down by the Federal Court at Buffalo, N. Y., that sustained a patent owned by The Permutit Company, 440 Fourth Avenue, New York, covering zeolite water softeners. The following extracts are taken from the Circuit Court's opinion:

"The patent is claimed to disclose an apparatus for utilizing zeolites having a sodium base in the softening of water. The zeolites take the hardening constituents, lime, or lime and magnesia, completely out of water even though there originally were sodium compounds in the water.

"By the use of the apparatus in suit, for the first time, zero water has been produced.

"It is a great advance in the art of softening water. Its savings to manufacturers have been enormous.

"It is that class of inventive thought which it was the intention of Congress to protect as a valuable contribution to the useful arts. The inventor is entitled to his reward and the appellee to its protection.

"Decree affirmed."

The "Imp" Yarn Cleaner Gauge.

An improved yarn cleaner gauge, for use on winders, is being introduced by B. P. Mates & Company, 207 Meriam Building, Cleveland, Ohio. This is a practical device for the elimination of waste and damage on yarns and its purpose is to remove foreign matter from the yarn without scraping the raw material. This gauge, which is shown in the accompanying illustration, has several features that seem to make it especially well equipped for the work for which it was designed.

The "Imp" gauge, as this device is known, has an angle shaped guide which is so constructed that the operator can drop the yarn between the blades without looking; it is also equipped with a porcelain roller at the rear which

revolves with the yarn, eliminating unnecessary friction. The micrometric gauge can be adjusted to regulate the space between the guides for any size of yarn according to a standard scale, and this adjustment cannot be changed without the adjusting key, which is kept by the foreman, thus preventing tampering by inexperienced help.

Very good results from the standpoint of a saving in waste, an increased production and a resultant decrease in operating cost are reported for this gauge when used on either knitting yarns or weaving yarns. This device will fit any winder and can be adjusted to all yarns of cotton, woolen, worsted or silk. It is also very effective in eliminating back winding.

A novelty in the way of shade cards has been produced by the National Aniline & Chemical Company, Inc. This is a three-leaved folder entitled "Mode Shades for Ladies' Dress Goods." These generally comprise those delicate nuances of color which are only obtainable by expert and judicious use of combinations. The possibilities in this direction are limitless.

ANILINE DYES
FOR ALL TRADES

We carry in stock a complete line of Aniline Dyes for all trades.

Sandoz Dyestuffs are manufactured at our various works.

SANDOZ CHEMICAL WORKS, INC.

For samples and prices apply to our offices

238-240 Water St. NEW YORK — 36 Purchase St. BOSTON — 12 So. Front St. PHILADELPHIA

175 Market St., PATERSON

Southern Office:
Room 407, Commercial Bank Bldg., Charlotte, N. C.

SANDOZ CHEMICAL WORKS — **BASLE SWITZERLAND**

D'OLIER
ELECTRICALLY DRIVEN CENTRIFUGAL HYDRO-EXTRACTORS

Twenty years experience in Extractor work. Builders of first direct Motor Driven Machine. No excessive vibrations, center of gravity low. We also make under-driven type of machines. Our Engineering Department is at your service with its years of designing and building Centrifugal Extractors.

Write for Bulletins I-115, I-116, I-116-A, -B, -C

AIR COMPRESSORS — **CENTRIFUGAL PUMPS**

The United States and Cuban Allied Works Engineering Corporation

165 Broadway, New York

Works: Bradford, Pa. *Cable, "Idolwax," New York*

AUTO GYP
Process of Dyeing

Stop Bleaching

THE AUTOGYP PROCESS simultaneously *bleaches and dyes* to the required shade in ONE OPERATION of THREE HOURS TIME.

Evenly dyed shades, stronger, better looking fabric with a softer feel are the results of substituting this process for the antiquated method of bleaching and dyeing separately.

AUTOGYP SAVES:

Six separate steps and operations.
3½% of shrinkage.
25% of tensile strength.
50% of steam.
30% of labor.
90% of water.

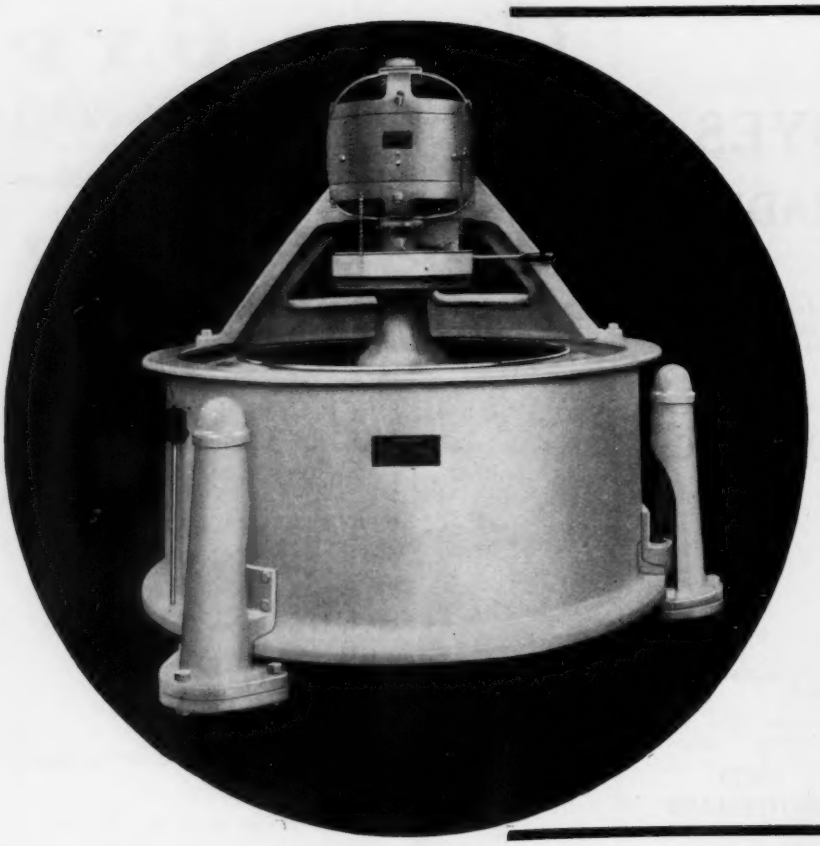
It saves all the chemicals used in the chloride of lime method of bleaching. It saves boiling out in kiers or other appliances. It saves from 4 to 17 hours time, as it performs the complete operation to shade in THREE HOURS TIME. Compare this time with the time required in the old fashioned method.

There are numerous other advantages, and we invite you to write for full particulars. There is no reason why you should not be taking advantage of these savings offered you in AUTOGYP.

SURPASS CHEMICAL CO. INC. — FIRST IN AUTOGYP PROCESS OF DYEING — AUTOGYP — PATENTED IN U.S.A. SEP. 24 1918, IN CANADA OCT. 10 1918 — ALBANY, N.Y.

Write for full particulars.

Surpass Chemical Co.,
Albany, N. Y.



The

Safety First

Extractor

"Hercules-Electric"

SIZES 6" to 72"

EAST JERSEY PIPE CO.

PATERSON, N. J.

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E. S. Player
Greenville, S. C.

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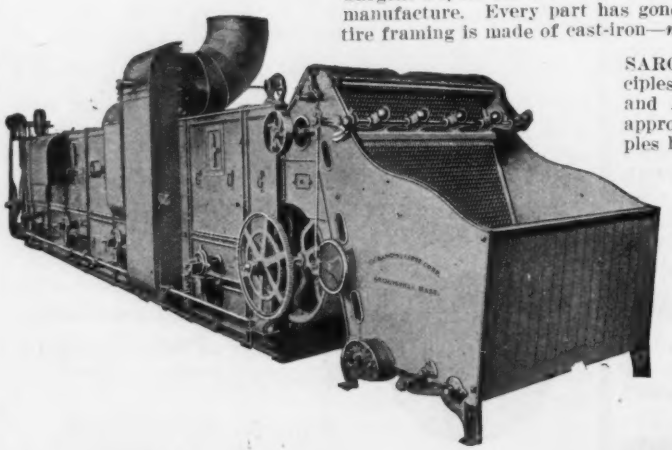
The Development of 35 Years' Study and Experience

Sargent Dryers are the result of 35 years of study and experience in drying machine manufacture. Every part has gone through exhaustive tests—for instance the entire framing is made of cast-iron—*not* structural steel.



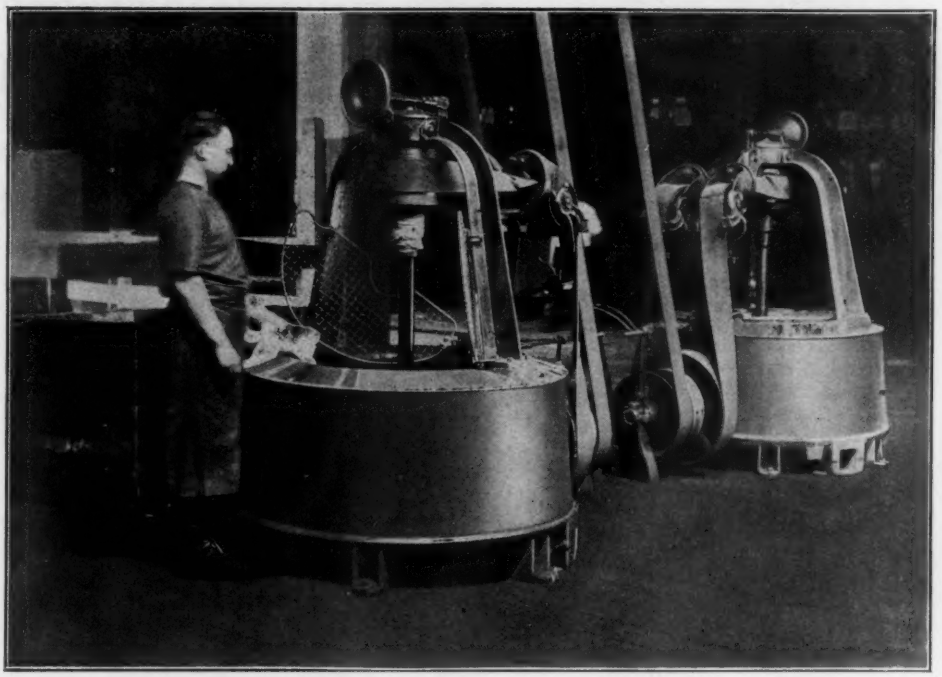
SARGENT DRYERS are constructed on basic principles of Automatic Feeding, Continuous Conveying, and Air Circulation, which for years have had the approval of expert drying engineers. These principles have been so combined and adapted as to make a complete machine which is unexcelled.

Sargent Dryers are built in over fifty standard sizes and in various combinations and special designs, admitting their widest range of use. Before recommending any dryer we always wish to know as many facts concerning the problem, so that we may furnish a machine that will give entire satisfaction. We are glad to confer with you and give every assistance possible.

Write today and let us explain the principles of SARGENT DRYERS.

C. G. SARGENT'S SONS CORP.
GRANITEVILLE, MASS.
Fred H. White, Southern Agent,
Charlotte, N. C.

Sargent Dryers



TOLHURST EXTRACTORS

It would be difficult to go through any well known textile mill and not find a TOLHURST machine. Here, for instance, is a battery of 40" TOLHURST "self-Balancing" Extractors installed in a leading Massachusetts plant, famous for its production of prints, fancy cottons and worsted goods. First used by this mill in 1893, repeat orders have since followed in orderly sequence.

Details relative to the notable work TOLHURST Extractors are doing here and elsewhere are at the disposal of all interested in centrifugal extraction. We build machines suitable to all requirements.

TOLHURST "Self-Balancing" Extractors: flexible bearings, motor, countershaft or engine drive from above or below—diameters 12"-72". TOLHURST "Center-Slung" Extractors: open top, grease-lubricated roller bearings, countershaft or motor under-drive, baskets 40" and 48", flexibly slung.

And other types.

Catalogue on request.

TOLHURST MACHINE WORKS

Established 1852 **TROY, NEW YORK**

New York Office, 111 Broadway

Southern Rep.:
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Charlotte, N. C.

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W. J. Westaway Co.,
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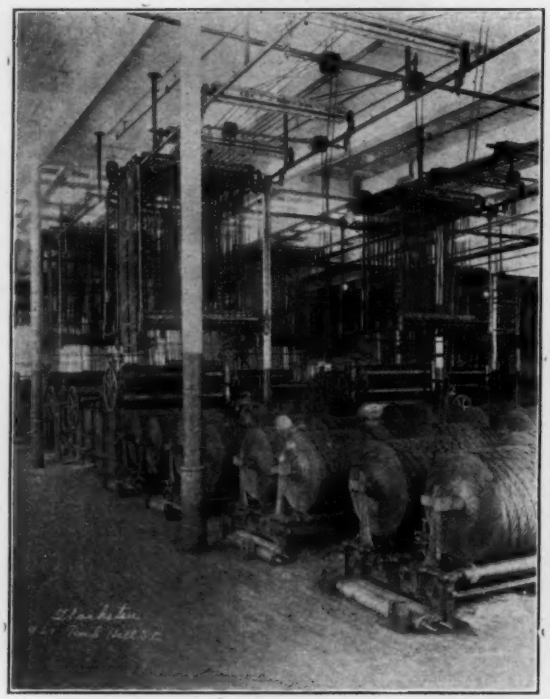
400 McGill Bldg., Montreal.



Continuous System Indigo Dyeing Equipment for Warps

In the equipment illustrated fifteen warps are led through a Two Compartment Boiling Out and Cooling Machine, through two Indigo Vats, and taken up by Dye House Ballers in one operation in an initial run.

In a second run the fifteen warps are led through two Indigo Vats, and are taken up by Dye House Ballers.

In a third or finishing run, five of these warps are led through a Two Compartment Wash Box operating in connection with the Dry Cans equipped with a five-unit Coiler.

The successful handling of warps through Continuous Drying Systems such as described is only possible through the use of Automatic Tension Controls and Regulators such as we build and use with our Dyeing Equipments.

For further particulars and prices, write or wire

Cocker Machine & Foundry Co.
Gastonia, N. C.

Builders of Warpers, Beamers, Warp Dyeing Machinery

WARPING MACHINERY

Linking Warpers—Linker Heads—Balling Warpers—Balling Attachments—Section Beam Warpers—Special Warpers.

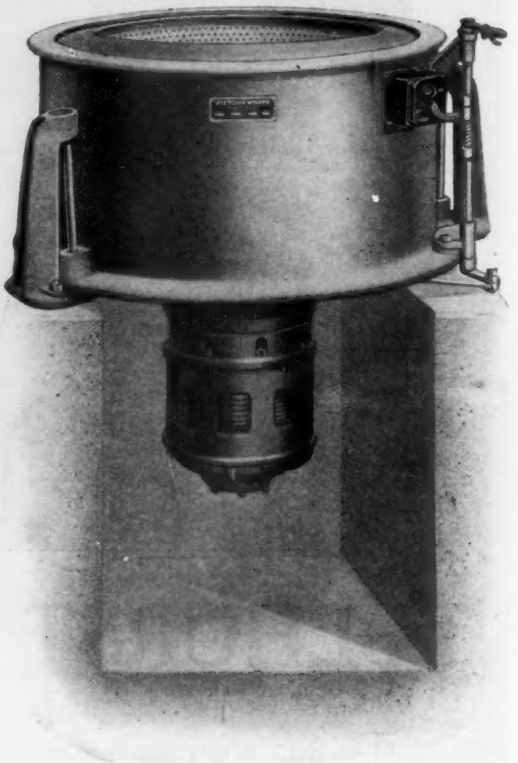
WARP BEAMING MACHINERY

Long Chain Beamers—Short Chain Beamers—Warp Splitters—Special Beaming Machinery.

WARP DYEING MACHINERY

Boiling Out Boxes—Continuous Systems—Sizing Machines—Doubling and Splitting Systems—Sulphur Machines—Indigo Vats—Warp Coilers—Dye House Ballers—Hydro Sulphite Equipment—Warp Bleaching Equipment—Drying Cans.

ELECTRIC UNDERDRIVEN
HYDRO EXTRACTORS



The Centrifugal with One Moving Part.

Ball Bearing—Easy Running Self-Balancing

Convenient and Efficient Control

Built for Service, with the Sturdiness of Construction which has made our Extractors "Famous for Three Generations."

Made in the size particularly adapted to your needs, either 42, 48, 60 or 72 inch.

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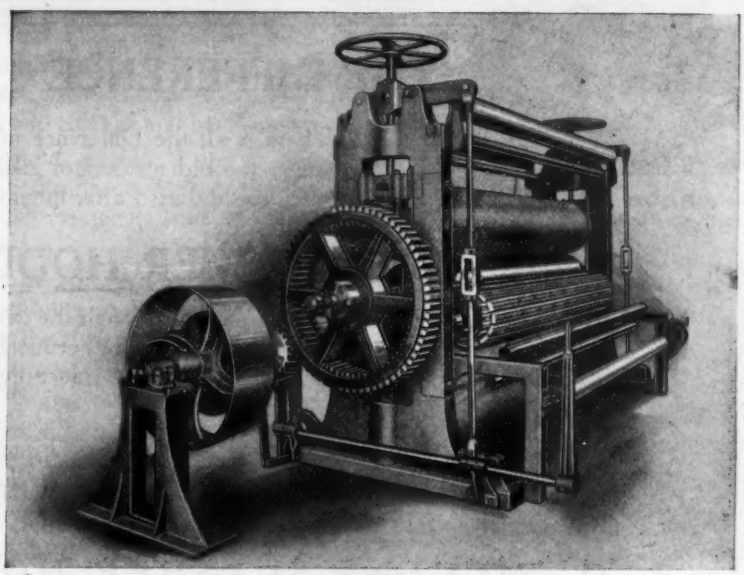
BUTTERWORTH



CALENDER (Three Rolls)

THE way in which your finishing machines work duplicates the way in which they are made.

You find a marked improvement in quality, speed, production and economy when you use finishing machinery backed by many years of striving to assure your satisfaction.

H. W. BUTTERWORTH & SONS CO.

Established 1820

PHILADELPHIA

PROVIDENCE OFFICE: Turk's Head Building

Southern Representative
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MANGLES (all kinds)
CALENDERS (all kinds)
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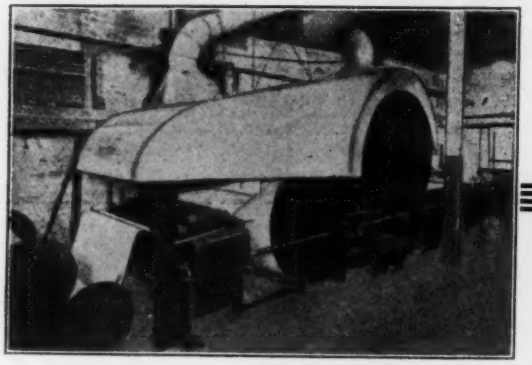
CELL DRYERS



SLASHER HOOD
Patented by R. O. Pickens

THE DIFFERENCE

There is all the Difference in the world between the old method of sizing and the modern method used after the installation of

PICKENS SLASHER HOODS

The thousands of yards of yarn passing through the Slasher Room each day can be handled much more efficiently and economically when PICKENS SLASHER HOODS are used because they are built on scientific principles.

Ten Southern Mills are now using them—Orders on our books for eight more—are YOU one of them?

A DEMONSTRATION WILL CONVINCE YOU.

R. O. PICKENS SLASHER HOOD CO.
Spartanburg, S. C.

FILTERS

PRESSURE GRAVITY

Especially designed to meet all requirements of Textile Mills.

Economical in upkeep.

Perfect satisfaction.

NORWOOD ENGINEERING CO.

Florence Mass., U. S. A.

CHAS. M. SETZER, Southern Representative,

Charlotte, N. C.

DRYING MACHINERY

for all Textile Raw Stocks, Yarns and Fabrics—built with the knowledge that only in dependable performance over a long period of years, can the lowest unit cost of drying be realized. This is service-value—bought at the lowest possible initial cost in "Proctor" Dryers.

"Proctor" DRYERS
The best dryers in the world for TEXTILES

PROCTOR & SCHWARTZ, Inc.
Formerly The Philadelphia Textile Mach'y Co.
PHILADELPHIA, PA.

How a Mill Eliminated Re-Dyeing

A prominent mill producing cotton and silk piece goods experienced much trouble and many losses in re-dyeing. Dark streaks and blotches on light shades, and light streaks and blotches on dark shades; also variations in shades were common occurrences that caused considerable re-dyeing and cost the mill much money.

A Permutit Zeolite Water Softener was installed to remove all the hardness from the water supply and tremendous improvements were at once noted.

All *blotches and streaks* immediately disappeared. They had been caused by the hardness in water that deposited insoluble soap curds in the fibres of the fabric, preventing the dye from taking evenly.

Variations in shades no longer occurred, for Permutit Softened Water is absolutely uniform at all times, and the changes in hardness that cause colors to vary are entirely done away with.

This mill is now manufacturing economically and dependably, as the high quality of their *soft water made products* bring additional revenue and reputation.

There is a Permutit solution to every problem. All analyses and investigations free of charge.

This booklet contains valuable information that every mill operator should have. Sent free, postpaid, upon request.

The Permutit Company
440 Fourth Ave. New York

Filters—Water Softeners—Special Apparatus

DURABLE K-W UNIVERSALLY USED

KLAUDER - WELDON DYEING - BLEACHING- SCOURING MACHINERY

There are K-W machines in use which were built nearly half a century ago and which are still doing their work efficiently and economically under severe service. This is sufficient evidence of the durability and capability of K-W machines after long years of subjection to the ravages of live steam, heat and alkalis.

K-W Machinery, by its accomplishments, has steadily and irresistibly built up a reputation that has made the name "Klauder-Weldon" synonymous with the **"world's best dyeing, bleaching and finishing machinery."**

Our interest in upholding the K-W reputation means that you MUST be satisfied, and our suggestions to prospective purchasers are made with the view toward solving any dyeing, bleaching or scouring problem for all time. We will be glad to answer any and all questions without obligation on your part whatsoever.

Write today for K-W Literature

THE KLAUDER-WELDON DYEING MACHINE CO.

Bethayres, Pa., U. S. A.

H. G. Mayer, Southern Agent,
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DYESTUFFS

OF

UNIFORM QUALITY AND DEPENDABILITY

SULPHUR BLACK

All Shades—Will not Bronze even in Heavy Service.

SULPHUR BLUE S A EXTRA

Red Shade

ZETA RED BROWN

Violet Shade of Red Brown

ZETA RED BROWN 3 R

Sulphur Maroon Shade

LABORATORY SERVICE

A. KLIPSTEIN & COMPANY

644-52 GREENWICH STREET, NEW YORK CITY

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SONNEBORN PRODUCTS

"Well Dressed Is Half Woven"

A warp properly dressed with AMALOL AND GLUANTINE saves loss in the weave room.

Everywhere these modern sizing products are used. From $500 to $3000 is annually saved —depending on slasher equipment and loom capacity.

Many customers' letters prove the point.

A New England mill manufacturing sheetings writes:

> "We have very good results with your sizing preparations. They perfect the penetrating qualities of the size and reduce the dusting off in the weaving remarkably. The yarn sized with your preparations remains pliable and does not get brittle and rough. They also make a saving in the cost of the size and in slasher cloth wearing much longer than with any other sizing we ever used, proving that they are free of corrosive chemicals."

Profit by the experience of others. Test Amalol and Gluantine. 90% of our customers were satisfied with old methods until they tried our products.

Order a barrel of Amalol and Gluantine on approval—satisfaction guaranteed! Our cotton mill specialist will personally conduct practical test without obligation.

L. SONNEBORN SONS, Inc.

Textile Products Division

262 Pearl Street **New York City**

W. D. INGLE, Southern Representative, Charlotte, N. C.
DUCKWORTH & KENDRICK, Selling Agents, Greenville, S. C.

SONNEBORN

Established 1815

ARNOLD HOFFMAN & CO., Inc.

Providence New York Boston Philadelphia Charlotte

All Kinds of

HEAVY CHEMICALS

Sole Agents for

BELLE ALKALI CO.

of Belle, W. Va.

Manufacturers of

LIQUID CHLORINE
BLEACHING POWDER
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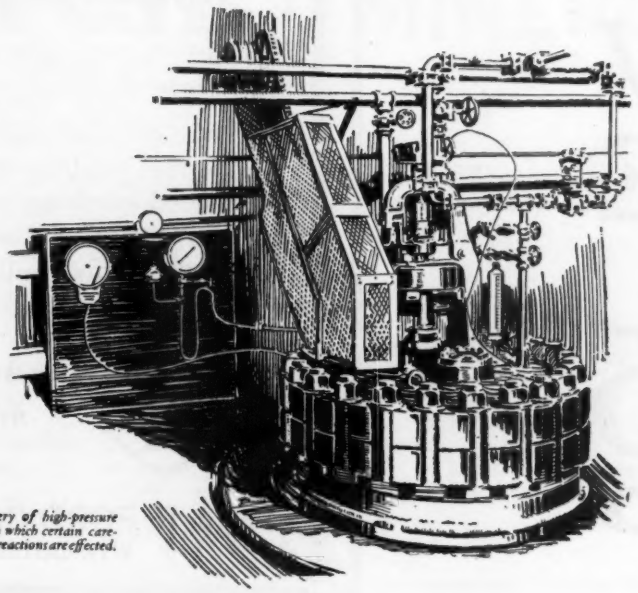
Solid and Flaked

We solicit your inquiry for prompt or future delivery

DU PONT

VAT ACID CHROME BASIC SULFUR DIRECT

DYESTUFFS



One of a battery of high-pressure fusion-kettles in which certain carefully controlled reactions are effected.

Constant Vigilance

IN order to insure the production of standard uniform dyestuffs, every step in their manufacture must be under constant observation.

Pressure, temperature, speed of agitation as well as duration of reaction are vital factors which, if not kept under absolute control during dyestuffs manufacture, destroy every desirable quality.

The excellence of Du Pont plant control is reflected in the *uniformity* of the product. You get *uniform* results from *uniform* Du Pont Dyestuffs.

E. I. du Pont de Nemours & Co., Inc.

Dyestuffs Department

WILMINGTON DELAWARE

BRANCH OFFICES:

New York Boston Providence
Philadelphia Chicago
Charleston, S. Car.

STANDARD DU PONT DYESTUFFS UNIFORM

DEVELOPENE

Makes Black Blacker

Manufactured Only by the

KALI MFG. CO.

1404-1410 North Front St.

PHILADELPHIA, PA.

Aqua Ammonia and Ammonia Salts

Clean Floors

And clean painted walls are easily and economically assured by the use of

Wyandotte Detergent

because it was especially made to do that class of work.

Why not insist that the supplies you use possess qualities suited to the work demanded of them, just as you insist on men with special training for certain positions in your mill?

Ask your supply man or write us.

The J. B. FORD CO., Sole Mnfrs.,
WYANDOTTE, MICH.

Soluble Grease

To make the stock yarn or warps Run Smooth, regardless of dyes that make the Cotton Fibre harsh.

BOSSON & LANE
ATLANTIC MASS.

Staley's Starch

Staley's Eclipse Thin Boiling Starch is recognized everywhere as supreme for sizing and finishing. Every fibre of the yarn is penetrated, yet it remains soft-feeling and smooth and *gains* 10% to 15% in strength. "Seconds" are virtually eliminated and shedding under looms decreased considerably.

The Staley Technical Staff is maintained to serve those manufacturers whose problems can best be met by special quality starches. Our facilities for scientific research are unsurpassed in the industry.

Write for samples and prices.

A. E. STALEY MFG. CO.

Decatur, Illinois.

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"BRETON" MINEROL "F"

For
Cotton Print Goods
"It prevents foaming in the color box"

BORNE, SCRYMSER CO.
Established 1874
80 South Street, NEW YORK
BOSTON **PHILADELPHIA**
Works: Elizabethport, N. J.

Chlorantine Colors

The conspicuous feature of the Chlorantine Colors is their *unusual fastness to light.* For level dyeing, where fastness to acid, alkali, rubbing, and hot pressing are required—THEY ARE UNEXCELLED.

Recommended for application to all goods which must withstand the action of light, such as UPHOLSTERY GOODS, CASEMENT CLOTHS, CURTAINS, VELVETEENS, LINEN PLUSH, Etc.

iba Co. Inc.
BRANCHES BOSTON PROVIDENCE
PHILADELPHIA CHICAGO
COLUMBUS, GA.
CEDAR and WASHINGTON STS.
NEW YORK

Sole Representatives in the United States of the
SOCIETY OF CHEMICAL INDUSTRY IN BASLE, SWITZERLAND

THE GRASSELLI CHEMICAL CO.

DYESTUFF DEPARTMENT

117 HUDSON STREET, NEW YORK, N. Y.

SULPHUR BLACK GAC

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SULPHUR CUTCH 2R and BN

SPECIALTIES FOR MERCERIZED COTTON AND COTTON-SILK HOSIERY

DIRECT CORDOVAN—DIRECT NAVY BLUE
DIRECT BLACK G EXTRA

BICHROMATE OF SODA SODIUM SULPHIDE

ZINC DUST, CHEMICALS AND ACIDS

BRANCH OFFICES:

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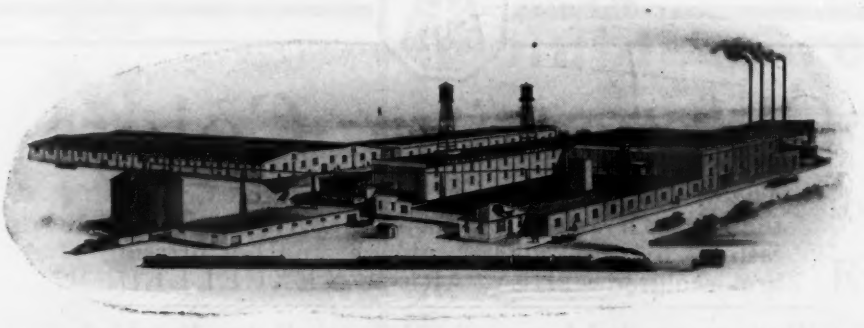
CHARLOTTE NEW ORLEANS SAN FRANCISCO

THE GRASSELLI CHEMICAL CO., LTD., TORONTO AND MONTREAL, CANADA.

SOLE SELLING AGENTS FOR **ESSEX ANILINE WORKS, INC.,** BOSTON, MASS.



VICTOR MILL STARCH

The Weaver's Friend

It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

THE KEEVER STARCH COMPANY, Columbus, Ohio

Southern Agent: MR. JAMES H. MAXWELL, Greenville, S. C.

If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience.

Starch

400 MILL
500 MILL

EAGLE ★★★
EAGLE ★★
EAGLE ★
EAGLE ★★★★

FAMOUS N
C. P. SPECIAL

Blue River Crystal

These STARCHES are manufactured by carefully controlled and standardized methods.

PURITY and UNIFORMITY are secured by accurate laboratory tests.

ECONOMY and EFFICIENCY are proven by the constantly increasing number of exacting cotton manufacturers who are getting satisfactory results by using our STARCHES especially selected for their conditions.

Recommendations are based upon intelligent investigation of each individual problem.

Corn Products Refining Co.

New York

Southern Office *Greenville, S. C.*

Starch

JACQUES WOLF & CO.

Manufacturing Chemists and Importers

PASSAIC, N. J.

ALL FINISHING and SIZING PRODUCTS for COTTON

ANTISTAIN

MONOPOLE OIL
Reg. Trade Mark No. 70991

BLEACHING OIL
Kier boil Assistant

HYDROSULPHITE
For stripping and discharge printing

CREAM SOFTENERS

ALIZARINE ASSISTANTS

SAVOGRAN

The Standard Pure, Soluble Soap Powder
In Use for 46 Years

INDIA ALKALI WORKS
BOSTON, MASS.

ASSURED QUALITY
IN
Roller, Clearer and Slasher Cloths

We are in a position to supply cotton mills with the highest quality Roller Cloths, Clearer Cloths, and Slasher Cloths to meet every requirement.

Our Roller Cloths give just the right cushion and uniform even surface to produce the best cotton yarn.

Clearer Cloths with thick strong nap that does not pull out and is of uniform length allowing complete clearance of short fibre from the rolls.

The best quality of slasher cloths having sufficient cushion and porous enough to insure thorough forcing of sizing into the yarn.

A trial order will convince you of the superiority and economy of our goods. Write today for full information.

PHILADELPHIA FELT COMPANY

Frankford, Philadelphia, Pa.

Southern Sales Agent
M. C. SANDERS, GREENVILLE, S. C.

VERMONT SPOOL & BOBBIN CO.
OF
BURLINGTON, VERMONT.

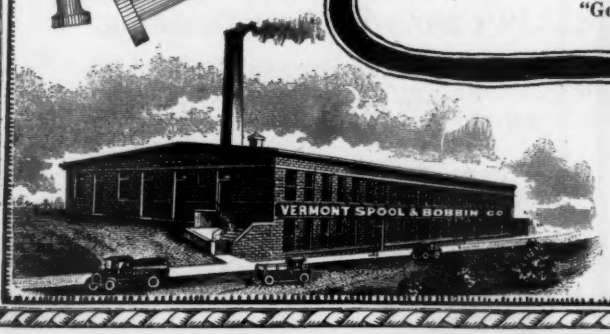
There are two prime requisites in the production of superior bobbins and spools—the plant and long experience. We have both.

Our plant is equipped with the most up-to-date and efficient machinery. From the selection of the wood to the finishing of the product the same care is exercised in every department—uniform bobbins and spools of the highest class being the result.

Our long experience in the design and manufacture of spools and bobbins for textile mills all over the country enables us to understand your requirements and give you 100% satisfaction.

Give us a trial order and you will remain one of our satisfied customers. Write for prices.

"Good Goods at Fair Prices."



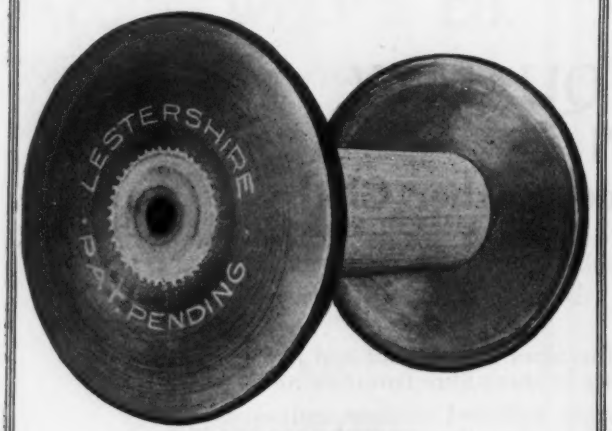


FIG. 2. LESTERSHIRE FIBRE HEAD SPOOL

"LESTERSHIRE" Vulcanized Fibre Head Spools

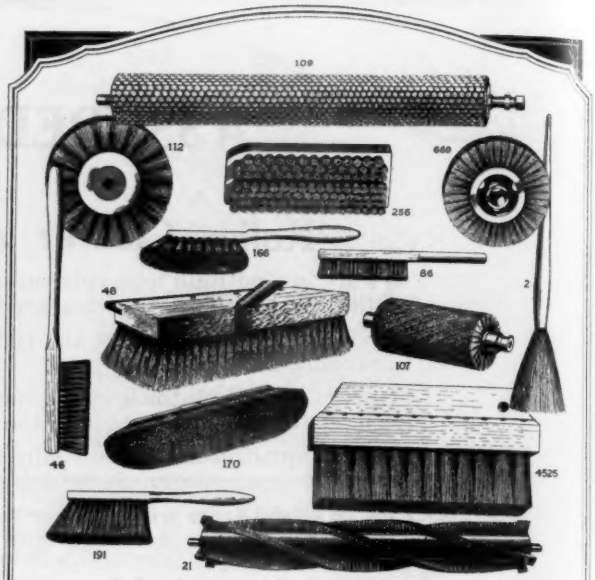
Lestershire Fibre Head Spooler and Twister Spools are the most economical Spools in use today. They will last longer, give better service and increase your production.

Write for details as to how these Spools will save you more than their original cost in the first six months' use.

Lestershire Spool & Manufacturing Co.

Johnson City, N. Y.

Spool heads that will not break, splinter nor roughen, with dogwood or fibre spindle bearings.



The Proper Brush

—for every textile need!

Specializing, as we do, in the manufacture of textile brushes, there is a suitable one in our line for every cotton mill requirement.

With the complete understanding we have of the service such brushes must render, you are correct in presuming that the bristles are selected for the particular use each brush is intended.

Brush Repairing . . . is another department of our business that is on a par with manufacturing.

Promptness in shipping is an added virtue.

Atlanta Brush Co.

Atlanta, Ga.

ALL STEEL
Loom Beam Heads

Eliminate breakage and replacement.

Will not bend or spring in warping or in ordinary handling of beam.

Construction is such that your cast-iron head can be duplicated.

Ask for catalogue.

Patent Pending

Patent Pending

Mossberg Pressed Steel Corporation
Attleboro, Mass.

OUR SERVICE OFFERS

COTTON MILLS
A WIDE AND READY
MARKET
FOR THEIR USED TEXTILE MACHINERY & SUPPLIES

We are constantly designing and equipping mills for which we require high-class used machinery at fair cash prices. Send us a list of your offerings and start the way for a sure sale.

WE CAN ALSO FURNISH ADDITIONAL CAPITAL FOR TEXTILE ENTERPRISES

WATCH THIS SPACE
MONTHLY

WANTED

Breaker and Finisher Pickers 40" Rev. Flat Cards 12 x 6" Slubbers. In replying please send full description as to age, condition, etc.

TEXTILE SERVICE & EQUIPMENT CO.
CLEVELAND, OHIO

No "bad cloth" when you weave with "DUPLEX" FLAT STEEL LOOM HARNESS

STEEL HEDDLE MFG. CO.

GREENVILLE PHILADELPHIA PROVIDENCE

Southern Office

511 Masonic Temple Greenville, S. C.

Hampton Smith, Southern Manager

N. B.—We are the sole manufacturers of nickel-plated drop wires for every kind of loom.

SAFETY FIRST

O-C Patented Roving Can Indicators provide the best, simplest and most efficient method of avoiding mixed work in the Carding Department. By eliminating painting and the tying of strings, they remove the unsightly conditions which generally result when trying to avoid mixed work. They eliminate the need for an extra supply of cans, thereby allowing all cans to be in use at the same time, avoiding delay.

A trial order will convince you. Sample sent and prices quoted on application.

O'MALLEY & CARROLL

Manufacturers of

Roving Can Indicators

UTICA NEW YORK

AMERICAN

SUPPLY COMPANY

PROVIDENCE, R. I.

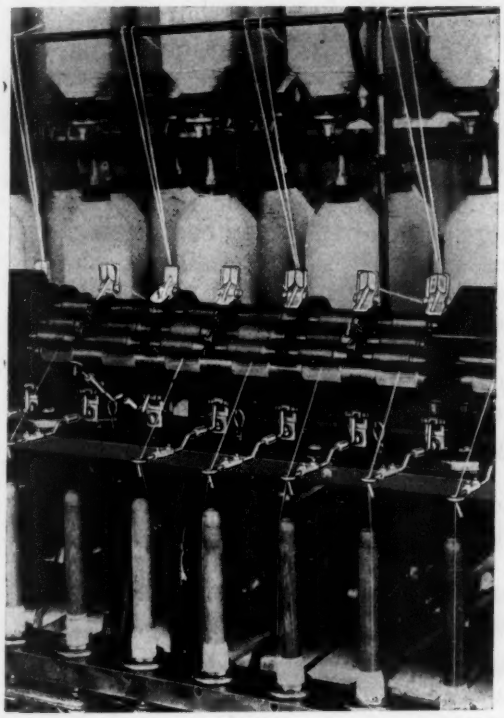
MANUFACTURERS OF

Loom Harness,
Weaving Reeds,
Oak Tanned Leather
Belting, Strapping,
Etc.

We make a specialty of Harness for Warp Drawing Machines

NOTE—No orders too large for our capacity. None too small to receive careful attention.

WASTE PREVENTION



BY the use of the Eclipse Automatic Stop Motion, 95% of the Roving is converted into yarn.

Any make of spinning frame can be equipped with this waste preventing device.

Let us explain in detail.

ECLIPSE TEXTILE DEVICES

Incorporated

Elmira, N. Y.

Can You Increase Production by Altering Speeds?

There is a certain speed for your frames that means maximum production. A lower speed means unnecessarily lessened output, while a higher speed creates difficulties which have an equally serious effect on production.

A constant study of speeds, therefore, is necessary for efficient operation in every textile mill.

The Foxboro Tachometer is designed for hand application to spindles and front rolls of slubbers, intermediates, fly frames, jack frames, spinning frames or any machine shaft, pulley, motor or generator. It shows at a glance the R.P.M. It replaces the inaccurate, slow and costly "Stop Watch and Counter" method.

The Foxboro Tachometer recommended for Textile Mills covers any speed from 100 to 12,800 R.P.M. It is not affected by vibration, magnetism or temperature and can be held in any position. The pointer gives an instantaneous reading and does not flutter.

The knowledge gained by the use of the Foxboro Tachometer enables you to make savings worth many times the cost of the instrument. Write for Bulletin A.S.61-2. Let us tell you about our free trial offer.

The Foxboro Co., Inc.

Foxboro, Mass., U. S. A.

New York Chicago San Francisco Tulsa
Pittsburgh Philadelphia Birmingham

FOXBORO

TRADE MARK

11-S-113

The "E Pluribus Unum" of business

No sale or business transaction can take place without a "meeting of minds." Whether a block or a thousand miles separate buyer and seller, their minds must meet before goods can be sold or bought.

In the old days trading at a distance was slow and cumbersome; the standards of merchandise, demand and price varied widely every hundred miles. Big, economical production was impossible. The world moved with a slow and halting pace.

The contrast between that period and today demonstrates that *civilzation can advance only in proportion to our ability to disseminate thought and transport things.*

This principle is the foundation of our national unity. The United States is not merely a physical union, but a union of hearts and minds created by common ideals, uniformity of education, common habits, thoughts and purposes.

This is made possible largely by unifying influences not possessed by the ancients—by our great, pulsating *highways of intelligence*—the daily, weekly and monthly publications.

No more than three or four of the readers of this paper may be in a single town, and the others similarly scattered over the country but all read the same news, get the same ideas, learn of the same goods, and thus the group is integrated and bound together by a common source of information.

By establishing these great information routes between the members of the various trade and industrial groups, the Business Paper makes one market of the whole country for the seller, and gives to the buyer a nation-wide source of supply.

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Each has subscribed to and is maintaining the highest standards of practice in its editorial and advertising service

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Engineering News-Record
Factory
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Mill Supplies
Mining and Scientific Press
Modern Hospital (The)
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Motorcycle and Bicycle Illustrated
Motor Truck
Motor World
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Railway Mechanical Engineer
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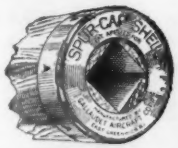


Pat. Applied for

SPUR-CAP SHELLS

Made to Stand the Hard Knocks

MANUFACTURED BY

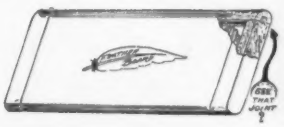
GALLAUDET AIRCRAFT CORP'N.,

EAST GREENWICH, R. I.

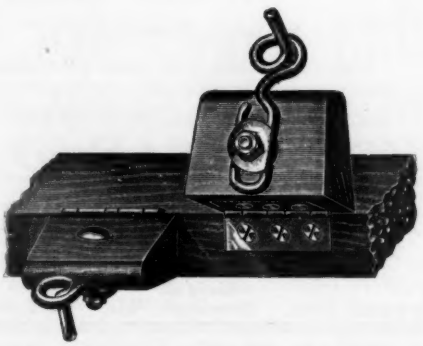
FEATHERBOARD

The Master Cloth Reel

LIGHT AND STRONG. IMPROVES YOUR PUT UP.



The Palmer Adjustable Thread Guide



For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

Patented and manufactured by

THE I. E. PALMER COMPANY

Middletown, - - - Connecticut

EIGHTY THOUSAND

Automatic looms of all types, including plain looms made automatic, from Maine to Louisiana, now use and endorse the

CLAYTON & BENTLEY

IMPROVED AUTOMATIC

THIN-PLACE PREVENTERS

as the most economical and positive relief from Thin Places available. All interested mills are offered the opportunity of proving the merits of this appliance in their own mills, by testing samples, without expense or any sort of obligation. Simple permission to have an Erector call and equip a few looms for as long a test as you desire is all that we solicit, as the device does its own talking.

Our sales in 1921 exceeded any previous year. The appliance quickly pays for itself—thousands of our first models have been in constant use eight to ten years—have paid for themselves many times over—are still good for many years to come—the upkeep expense being just about NOTHING NET.

Manufactured by

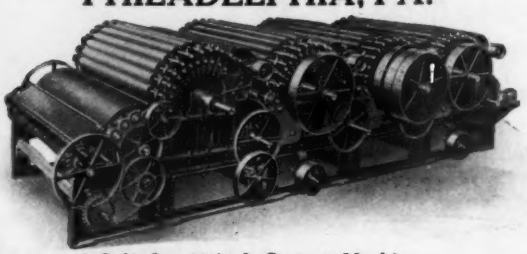
CLAYTON & BENTLEY CO.

88 Stonewall Street, Atlanta, Georgia.

SMITH & FURBUSH MACHINE CO.

PHILADELPHIA, PA.

A Garnett Machine of this size will reduce to fibre hard twisted thread waste without materially shortening the staple. We also build smaller machines for working soft washes.



4 Cylinder 30-inch Garnett Machine.

This Garnett is built on our own sectional unit frame construction and contains many improvements which we will be glad to explain.

Ask for Circular S-182.

PERBURCo
HOSPITAL EQUIPMENT
Whatever your needs for a first-aid room or the largest hospital, PERBURCO Hospital Equipment will satisfactorily and economically fill your requirements better than any other equipment. Acknowledged and specified by the profession and leading authorities. We will be glad to send experts to advise with you and specify equipment best suited to your needs.
Our new catalog gladly sent on request.
PERRYMAN-BURSON CO.
Expert Truss Fitters
23 Houston St., Phone Ivy 5523
ATLANTA, GA.

BOSTON HANK CLOCKS

The Recognized Standard for Accuracy and Durability

Many thousands in use.

Lasts many years.

All parts interchangeable.

Prompt delivery.

Special clocks to order.

Write us your requirements.
Our experience is at your command.

Boston Clocks tell just what the production from each frame actually is

BOSTON MACHINE WORKS CO.
LYNN, MASS. U.S.A.

Offices at
Cincinnati, Ohio. Milwaukee, Wis. St. Louis, Mo.

BYRD'S SERVICE

A combination of

EFFICIENCY, PROMPTNESS and ECONOMY in the production of printing

With the largest printing equipment in the Southeast, and with thirty-five years experience, we are in position to handle all of your printing requirements from the smallest office form to the largest illustrated catalog.

Send your next requisition for printing to us—we make the price right.

BYRD PRINTING COMPANY

Established 1867

BYRD BUILDING :: ATLANTA, GA.

THE "Southwestern Iron Clad"

Is the IDEAL Cotton Mill Broom

Only the best grade of broom corn is used in these brooms—they are built strong and will withstand the hardest usage.

The light weight, yet strong and substantial shields used gives the broom ample protection and at the same time allows the proper amount of of broom corn to be used, thus giving them excellent sweeping qualities.

MADE RIGHT!
PRICED RIGHT!

Inquiries and orders receive prompt attention.
Sold direct and through
all principal distributors.

The Southwestern Broom Mfg. Co.
Evansville, Indiana

300 Great Mills

Have Increased Their Profits Through

CLEAN FLOORS

Because CLEAN FLOORS are an aid to CLEAN production.

Not merely in the sense of keeping the product free from dirt, but in its broadest meaning, has this fact been proved.

With the adoption of the FINNELL SYSTEM of Power Scrubbing and the resulting CLEAN FLOORS, even the morale of the workers has been "CLEANed." Their loyalty and efficiency was so greatly developed that the increase in production and its quality has been gratifyingly conspicuous.

CLEAN FLOORS

save money, provide better working conditions, reduce waste, soilage and accidents, make healthier and happier workers and improve light and air. But CLEAN FLOORS are acquired only by CLEAN methods. If they're not 100%, they're not CLEAN. Hand scrubbing and mopping systems cannot produce CLEAN FLOORS.

Finnell Scrubbing Equipment is 100% Efficient

Finnell Scrubbers remove ALL the dirt with a surprising uniformity maintained throughout every branch of the System. And Finnell Scrubbing costs less than hand work. A Right Size for any Size Mill.

Write today for FREE Folder.

AMERICAN SCRUBBING EQUIPMENT CO.

General Offices and Factories:
1229 N. Collier St., HANNIBAL, MO.
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"Clean Floors Reflect Clean Business"

Are your floors CLEAN?

Interior of B. Edmund David, Inc., Factory at Wilkes-Barre, Pa., 64 feet wide with only Single row of Columns.

Possession in only 53 Working Days

Cellar excavated from solid rock
2-Story Concrete Building, 158 x 64 feet
No night work—little overtime
Cost to owner 4% less than estimated

ON April 1, 1921, after considering competitive bids, B. Edmund David, Inc., awarded us a contract to design and construct a factory on a fixed fee basis. Possession of the new building was required not later than August 1, 1921, the day the lease on the old factory of B. Edmund David, Inc., expired.

Two and a half months after our contract was signed looms were installed in the new factory—June 15, 1921.

While our paramount purpose was speed, at the same time we managed to economize. We saved our client 4% of the estimated cost on the entire job.

Note: Mr. Binger will be glad to call on you during his next trip in your section, or if your problem is urgent, he will arrange to call at once.

THOMPSON & BINGER
INC.
ENGINEERS & CONTRACTORS
CONSULTATION - DESIGN - CONSTRUCTION

NEW YORK
280 MADISON AVE.

SYRACUSE
GURNEY BUILDING

CONCRETE

Lips Cannot Touch the NOZZLE

ONE of the greatest sources of, and aids in, the spreading of disease is the drinking fountain, public or private, if the water jet is vertical. SCIENCE has PROVEN this as an indisputable fact by actual test. It's NOT A THEORY.

The vertical stream falls back into the fountain head germ-laden from the drinker's mouth to be carried to the mouth of the next drinker.

"VERTICO - SLANT" STREAM FOUNTAINS have been especially designed to do away with this menace by jetting water at an angle that does not permit it to fall back to the fountain head.

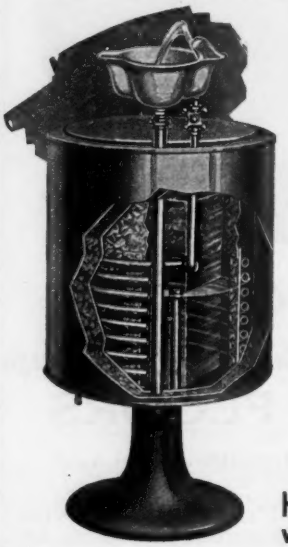
Our Fountain Equipment is Simple Yet Absolutely Sanitary. Write for catalog.

RUNDLE-SPENCE MFG. CO.
MILWAUKEE, WIS.

Puritan CANTONMENT DRINKING FOUNTAINS

Sanitary and Practical

Practical drinking mound is formed by mechanical means. Interference is set up in stream which retards water at the apex of arc. This stream makes it impractical to drink from any other point, thus insuring perfect sanitation. Approved by the U. S. Government. Now recognized by largest interests and schools in the country.



Puritan "Cantonment" Coolers are designed to connect with pressure lines and are so constructed that the drinking water does not come in direct contact with either the ice or ice water, but is circulated through brass coil which is tinned both inside and outside.

Write today for illustrated literature.

Halsey W. Taylor Company
Warren, :: :: :: Ohio

PRINTING

WE do it for some of the largest mills in the South—*Why not for yours?*

If our prices and service were not right, we could not do it.

THE A. J. SHOWALTER COMPANY
Dalton, Georgia.

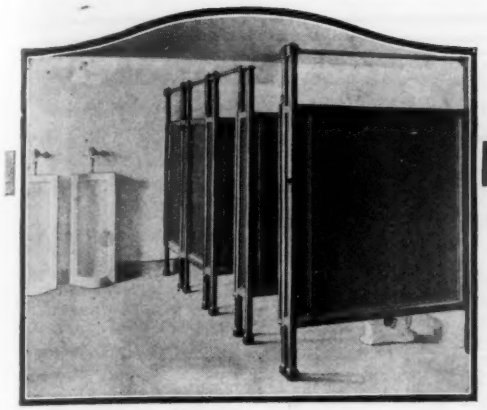
Save time distributing papers
Kleradesk

Automatically sorts and routes mail, memos, orders, etc., for all to whom mail is distributed. It holds reference papers immediately at hand when needed. Very convenient.

A Steel Sectional Device

Add compartments as required. Sections $1.20 each. Fifteen-compartment Kleradesk illustrated below only $19.20. Indexed front and back. Write for free, instructive folder, **"How to Get Greater Desk Efficiency."**

Ross-Gould Co., 318 N. 10th—St. Louis
New York, Chicago, Cleveland, Philadelphia (8)



Metal of course — and make it Sanymetal

WHEN you buy toilet partitions you'll want them to be **metal.** In cost, sanitation, and durability metal has proved its superiority. When you buy metal you'll want Sanymetal—the pioneer in the field, the toilet partition that has set the standard and maintained it. Specify Sanymetal by name—it's the partition that outlasts most any building.

Built in standard unit sections which fit any floor space or layout. Single or double doored or without doors. Easy to erect and permanently rigid when installed. Armco Iron and electro-zinc plating safeguard Sanymetal from rust. All doors equipped with Springless Sanymetal Gravity Roller Hinges. Our Catalog No. 2 shows all types of toilet, shower and urinal partitions.

Ask for—

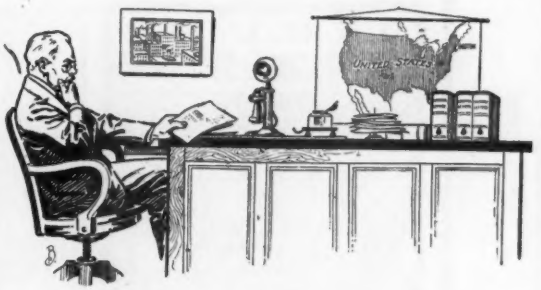
Catalog No. 4, also, just off the press, showing many installations of Sanymetal Office and Factory Partitions.

THE SANYMETAL PRODUCTS COMPANY

986 E. Sixty-fourth St., Cleveland, Ohio

Sanymetal

TRADE MARK U. S. REG.



Have You A Painting Problem?

You doubtless have a painting problem—and probably more than one.

But there is no reason why you should ponder over the matter, while our service and laboratories are at your disposal without charge.

Let us solve your painting problems. We know you want permanence in paint—we know you want pure white, light reflecting walls.

Zemco-lite

TRADE MARK

"The Cement Paint"

is a mill white with pure WHITE Portland cement as its base, therefore rendering it absolutely permanent. By "permanent," we mean—it cements itself to the walls in a hard, smooth coating, which *never discolors*, is too smooth to catch lint or mill dust, is unaffected by steam or moisture or mill conditions, doesn't fall off on fabric or machinery; and above all because of its wonderful light producing properties, it "refracts" light rather than "reflects" it and gives an interior absolutely free from glare, rendering it soft and pleasing to the operatives, thus enabling them to do better and more effective work.

We can solve your paint problem for any and every purpose, whether for interiors or exteriors. We have a variety of pleasing colors for exterior work.

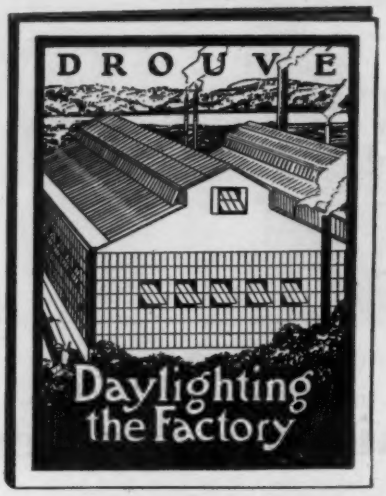
We can save you money in first cost as well as in the long run. Submit your problems to our experts. No obligation for our service.

Zemco-lite is put up in white powder form, but it is a paint, not a calcimine. Its initial cost per gallon, compared with other paints, is very low, its covering capacity large, and it is applied more easily and cheaply than lead or oil paints.

Ask today for full information and prices.

American Cement Paint Co.

Chattanooga, Tennessee



Look Into It!

Perfect lighting of the mill interior is today, more than ever, an economic necessity, and of all lighting, natural daylight is the best and cheapest.

If you are contemplating changes in your mill, new additions or a new mill construction, look into the matter of skylights. This interesting booklet tells how skylight roofs can be made as substantial as any other roofs, how glass breakage has been eliminated and corrosion prevented, how better lighting and more perfect ventilation is assured, illustrating many installations, and containing other data of value to the mill man.

A copy should be in every mill man's file. Write for your free copy today.

THE G. DROUVE CO.

BRIDGEPORT, CONNECTICUT

Safety and Economy

The Powers Steam and Water Mixer is the safest, simplest, and least expensive installation for supplying hot water. A sturdy, dependable machine—it never fails.

The Powers Steam and Water Mixer —an Instantaneous Water Heater.

Mixes live steam and cold water, supplying water of the desired temperature at the faucet. Thermostatically controlled against overheating.

Adapted to Wash Sinks, Shower Baths, etc., wherever high pressure steam is available.

Powers Bulletins

Our Bulletins contain accurate data on automatic heat control as well as complete information regarding Powers Regulators. *We will send them gladly on request.*

THE POWERS REGULATOR CO
Specialists in Automatic Heat Control

985 Architects Bldg. NEW YORK — 2761 Greenview Ave. CHICAGO — 596 Boston Wharf Bldg. BOSTON
The Canadian Powers Regulator Co., Ltd.
TORONTO, ONT., CANADA

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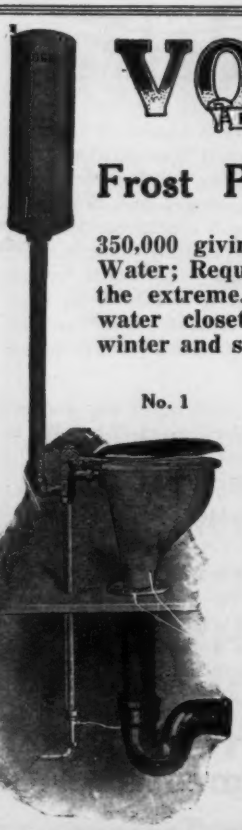


VOGEL
PATENTED

Frost Proof Closets

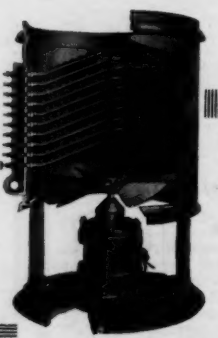
350,000 giving satisfaction. Save Water; Require no Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.

No. 1

- Enameled Roll flushing rim bowls.
- Heavy brass valves.
- Strong hardwood seat.
- Galvanized tank.
- Malleable seat castings will not break.
- Tested under hydraulic pressure before leaving factory.

ASK YOUR JOBBER

JOSEPH A. VOGEL CO.
WILMINGTON
DELAWARE



A Convenient Heating Unit

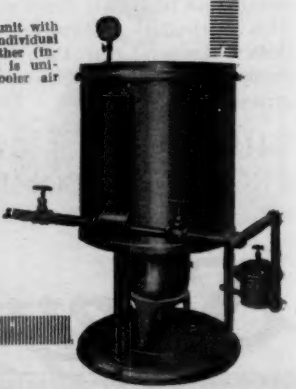
easily installed for either temporary or permanent heating service.

Bayley B. T. U.

is a complete self-contained heating unit with a heating surface consisting of individual spiral radiator coils one above the other (individually valved if desired). Heat is uniformly distributed by forcing the cooler air along the floor line through these coils by means of an electrically driven fan, thus creating a steady stream of tempered air and producing uniform temperature throughout the room. To install simply set on floor and connect steam and return piping and wiring to motor.

Send for bulletin today.

Bayley Mfg. Company
Dept. "I"
Milwaukee, Wis.



Village built by DuPont Powder Co.

These 2253 homes lined with Cornell Panels instead of lath and plaster

Cornell-Wood-Board is used in Mill Housing as well as factories, stores, offices and private homes, because it is the most economical material known for walls, ceilings and partitions that lies flat and *stays* flat, and does not crack or fall.

Cornell's rigidity and resistance to moisture is due to the "Triple-Sizing process which gives this wallboard triple the ordinary protection. Its "Oatmeal" finish is the handsomest effect in a wall board of any kind, and comes all primed for painting—"Mill-Primed."

Cornell Wood Board

Eight lengths, 6 to 16 ft.,—two widths,—"Cornell" 32', "Cornell" 48'

Special interior drawings, estimates and illustrated Book of Interiors on request. Write us.

CORNELL WOOD PRODUCTS CO., Dept. CO-2

General Offices, 190 N. State St., CHICAGO
Water Power, Mills and Timber Lands in Wisconsin.

At Last—You Can Protect Your Multiphase (Polyphase) Motors Against Single Phasing

WHAT ANOTHER ENGINEER WRITES:

"I have hundreds of records of Multiphase Motors running single phase with both starting and running sides of the compensator equipped with fuses. Also with the starting side fused and running side protected with overload relays, and no voltage protection, and the records run 50-50.

However, a fuse such as your Multiphase Time Limit Renewable Fuse is a boon to all the electrical industries, since it gives an operator absolute protection, and also the thousands of industrial plants that are not large enough to have an operator on the job, the fullest protection.

The principle of operating a fuse equipped with an auxiliary heat coil that will blow the next one to it from the open phase voltage of the blown fuse, and thus cut the motor from the line, is not only the last word in fuse construction, but the only means I know of that I would depend upon for the full protection of our Multiphase Motors and circuits.

We are backing up our other protective devices with Multiphase Fuses, because with our close supervision over our other protective devices that work mechanically they only work on extreme overloads, and the fact that they are mechanical, they oft times fail to operate at all."

Full protection to both Multiphase Motors and circuits. Fits your N.E.C. Fuse Blocks, Panels and Switchboards. Full fuse protection in addition to single phasing connection. Furnished either front or back connected.

Write today for full details and prices.

FEDERAL

National MULTIPHASE
TIME LIMIT·POWDER PACKED
RENEWABLE FUSE

FEDERAL ELECTRIC CO.

Federal Sign System (Electric)

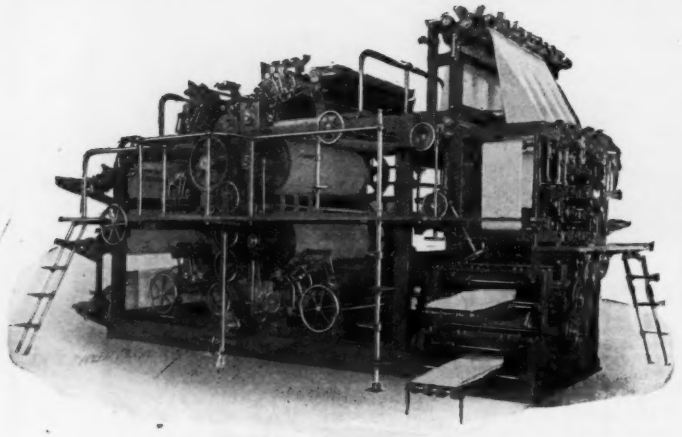
8700 STATE ST. CHICAGO

627-649 W. 43rd St., New York, N. Y.

91 New Montgomery St., San Francisco, Calif.

Branches in all large cities.

THE JOHNSON FRICTION CLUTCH



Courtesy of C. B. Cottrell & Sons Co., Westerly, R. I.

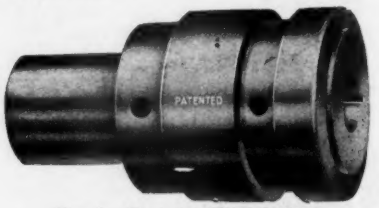
Friction Control Means Better Machinery

Johnson Clutches not only offer the finest type of clutch construction, but they are supported by an experienced engineering department, competent to determine the correct clutch arrangement for any conditions. We are always pleased to confer on any problems pertaining to the application of friction control on Textile machinery.

Friction Control on the Cottrell Printing Press

The Johnson Clutch is used to drive the rollers on this big rotary web printing press. It has been supplied as standard equipment on these machines for the last twelve years, and by its perfect performance and dependable service has contributed a great deal to the successful operation of the Cottrell Press.

A good friction clutch is much in demand on printing machines, and most of the leading manufacturers in this line are using Johnson Clutches. They have found that a Johnson Clutch drive brings out the highest degree of efficiency from a machine, and insures maximum of service.



Single Clutch—EXTERIOR

Write for our Catalogue "G"

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

PUT YOUR SLASHER CYLINDERS ON BALL BEARINGS

Hard pulling cylinders mean stretched warps and poor weaving. With ball bearings on the cylinders, a pull of less than twenty pounds will keep them in motion, so that there is no excessive strain on warps; the elasticity of the yarn is preserved, and better weaving is possible.

Our ball bearing boxes for slashers are moderate in cost, and can be installed by anyone in about an hour. They are dust-proof, and require oiling only two or three times a year.

AldricH MachinE

Ball WorkS Bearings

Greenwood, S. C.

General Electric

Distributing Jobbers

Complete lines of Rubber Conduit Wire, Switches, Safety Switches, Wiring Devices, Fuses, Edison Mazda Lamps and other electrical materials carried in our Atlanta and Savannah warehouses ready for immediate shipment.

Quick Service

Carter Electric Co.

Atlanta, Ga.

Established 1854 *Incorporated 1898*

THE A. & F. BROWN CO.

ENGINEERS, FOUNDERS AND MACHINISTS

Engineering and Sales Office, 79 Barclay Street, New York

Works
Elizabethport, N. J.

POWER TRANSMISSION SPECIALISTS

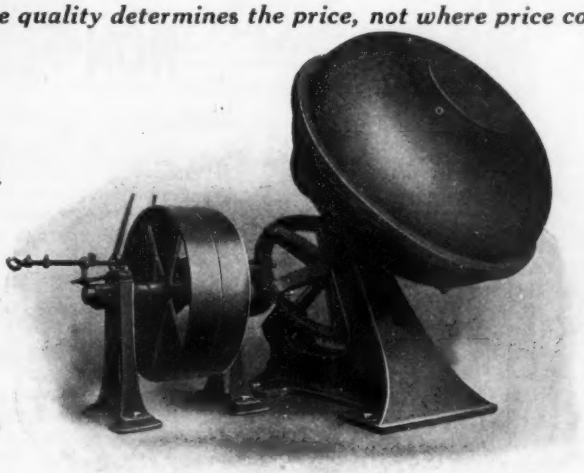
Stock Room in
New York City

Economy is where quality determines the price, not where price controls the quality

GEARS
MACHINE MOULDED
3" TO 16 FT. DIA.

PLANED BEVEL
UP TO 48" DIA.

CUT SPUR
UP TO 96" DIA.



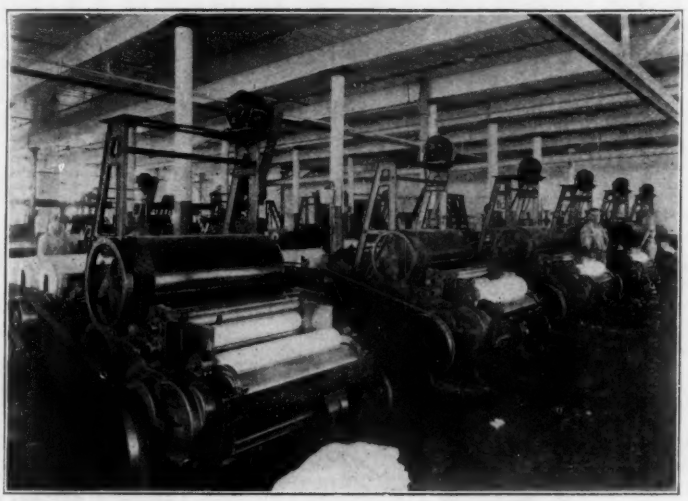
SHAFTING (Turned Steel)
PULLEYS
HANGERS
FRICTION CLUTCHES for
COUPLINGS,
PULLEYS,
GEARS,
SPROCKETS,
ETC.

Ball Color Mixer

Nine Sizes— 18, 24, 30, 36, 42, 48, 54, 72, 96 inches.

For mixing and secondary grinding of Colors, Chemicals, etc.

Textile Motors



ALLIS-CHALMERS

Induction Motors designed and built especially for Textile Drives are adapted to every type of drive, and are built in all sizes for all speeds.

Write for Textile Bulletin.

ALLIS-CHALMERS PRODUCTS
Electrical Machinery
Steam Turbines
Steam Engines
Gas and Oil Engines
Hydraulic Turbines
Crushing and Cement Machinery
Mining Machinery

ALLIS-CHALMERS MANUFACTURING COMPANY

MILWAUKEE, WISCONSIN. U.S.A.

ALLIS-CHALMERS PRODUCTS
Flour and Saw Mill Machinery
Power Transmission Machinery
Pumping Engines-Centrifugal Pumps
Steam and Electric Hoists
Air Compressors - Air Brakes
Agricultural Machinery
Condensers

A FEW DROPS OF OIL AT A TIME

This is the oiler that has taken the place of the old style wasteful oil can

It compels efficiency in oiling

Mr. J. S. Hulme
Atlanta, Ga.
is Southern Representative

⅛ Pint—4" Spout

It's a LIDSEEN PRODUCT

832-840 So. Central Ave., CHICAGO
Mfg. LIDSEEN POSITIVE FORCE FEED OILERS

BETTER **NON-FLUID OIL** LUBRICATION

Cutting Down the Cost and the Worry

Is what mill men everywhere are accomplishing through the use of

TRADE MARK REGISTERED IN **NON-FLUID OIL** UNITED STATES PATENT OFFICE

Modern Textile Lubricants

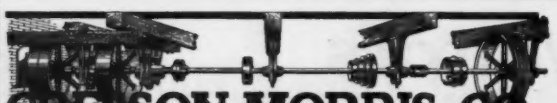
For economy NON-FLUID OIL is supreme—it affords perfect lubrication protection to machinery—and does this at less cost than liquid oil because it lasts so much longer per application.

And no more worrying about oil stains where NON-FLUID OIL is used—it stays in the bearing and off good cotton—it won't drip, spatter or creep.

May we send you a sample?

New York & New Jersey Lubricant Co.
401 Broadway New York
Southern Agent, L. W. Thomason, Charlotte, N. C.
Ample Stocks at our Branches:
Charlotte, N. C.; Greenville, S. C.;
Atlanta, Ga.; New Orleans, La.

AT LESS COST PER MONTH



CRESSON-MORRIS CO.

POWER TRANSMITTING MACHINERY

Merit Plus Recognition

"The heights by great men reached and kept were not attained by sudden flight."

Time, skill and effort must also precede merit as surely in machinery as in men.

Time, skill and effort must also precede merit in order to obtain and maintain for merit the recognition it deserves.

The great number of large installations of Cresson-Morris Power Transmitting Machinery is proof of both the merit and the recognition of the merit that nearly three score years of skill and effort hove endowed it with.

The cumulative knowledge of all this experience is always available to you in the recommendations of our engineers.

CRESSON-MORRIS COMPANY

ENGINEERS—FOUNDERS—MACHINISTS

PHILADELPHIA, PENNA.

Branch Office. 141 Milk St., Boston, Mass.

20

Standard Oxygen

STANDARD OXYGEN for Cotton Mills

There is more economy in STANDARD OXYGEN for cotton mills, because satisfaction is insured by prompt shipments, full measure and absolute purity. This satisfaction is attested to by the fact that our business has increased over 800% in the last two years. Hundreds of mills all over the South are using STANDARD Welding Apparatus and supplies.

We also just made a reduction in the price of our Oxy-Acetylene welding and cutting equipment.

Write for full details and new prices.

STANDARD GAS PRODUCTS CO., INC.
ATLANTA
Chattanooga, Gretna, La.

DEPENDABLE—ALWAYS
D-A
Lubricant
"Clings to Metal"

No Camouflage About This Lubricant

Many lubricants sold to textile mills are very light in color and are represented to be stainless. The lighter they are the dirtier and darker they get when in use.

There is no oil or grease with the proper lubricating value that will not stain. To cling to metal, it must have body and to have body it must be a natural oil, not an oil that has been bleached and diluted—robbed of its lubricating value.

There is no camouflage about D-A LUBRICANT. While its color is dark, it is pure and harmless—it doesn't stain yarn and cloth because when properly applied it will not thin down and throw off, but clings to the metal. In actual use its color lightens almost to that of a light cylinder oil. This is because it is pure—no fillers or binders or acids as frequently used, to disguise the staining properties of oil. Its life is 6 to 8 times longer than any other textile machine lubricant known.

D-A LUBRICANT is now being used in textile mills all over the country. It is packed in barrels, half-barrels and 50-pound cans. Write us for prices.

D-A Lubricant Company, Inc., Indianapolis, Ind.

Southern Representative:
John K. Gewinner,
33 Luckie St., Atlanta, Ga.

New England Representative:
MacNichol-Crosby Co.,
Little Bldg., Boston, Mass.

Chicago Representative.
W. D. Hudson & Sons,
180 N. Wabash Ave.

Fabreeka Belting

A Few Points of MERIT

Fabreeka Belting

FABREEKA is particularly adapted to cotton mills and quickly relieves any prevailing troubles.

FABREEKA on high speed textile machines is in a class by itself and has attained a degree of efficiency unknown where leather belting was formerly used. Over small pulleys it has NO EQUAL, its pliability and strength is guaranteed.

FABREEKA is practically impervious to acid fumes and gases, so we highly recommend it where such difficulties are prevalent.

FABREEKA is the ideal laundry belt, for water, steam and heat have no effect upon it. It will not slip when wet.

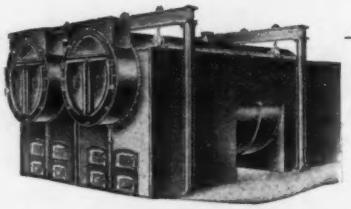
FABREEKA makes a wonderful conveyor belt for practically every purpose, for the reason that it is very tough, has great strength, flexibility and durability. Heat has little effect on it.

FABREEKA has won the admiration of all careful observers by its remarkable performance on what had been known as impossible drives.

There are numerous other points of merit, and we ask that you kindly write us today requesting full data and proof. No obligation.

Fabreeka Belting Company

30 India Street **Boston, Mass.**



The Result of a Quarter Century Experience

These years of experience and study together with exhaustive tests and improvements, has enabled us to build modern boilers that are second to none—in design, construction, high efficiency and capacity, economical operation, and low cost for upkeep.

Made in several types. White us today and let us send you full data and reasons why the W & W BOILER will best meet your requirements.

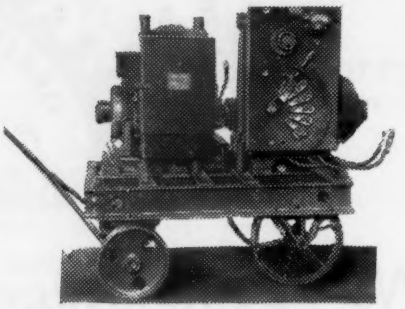
The Walsh & Weidner Boiler Co.

CHATTANOOGA, TENN.

WALSH & WEIDNER

TUBULAR WATER TUBE **BOILERS**

G-E Arc Welding Set



Better Welding Results

The master mechanic who desires speedy and perfect welding under diverse conditions will find the G.E. Arc Welding method accomplishes better resultes with greater facility, economy and permanence from the smallest crack or fracture to the union of large surfaces in iron, cast-iron or steel.

We can now supply the G.E. Arc Welding Set in stationary or portable models to textile mills, or can furnish you welding service of the highest quality. Our eleven years of welding experience enables us to serve you efficiently, economically and promptly.

Ask for prices on the G.E. set or write, wire or phone us and let us take care of your break-downs or worn parts.

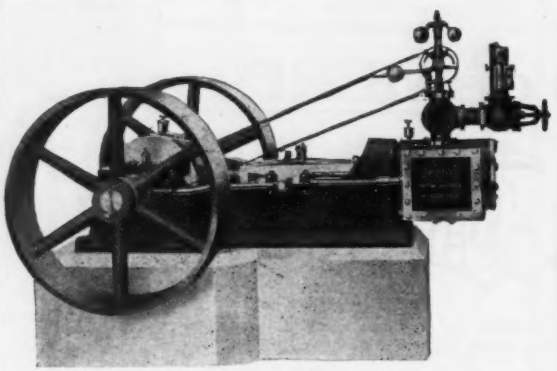
George Bird Bruce Potts

WELDING ENGINEERS

BIRD-POTTS CO.

WELDING Incorporated BUILDING

376-378 MARIETTA ST., ATLANTA, GA.



J. S. Schofield's Sons Co.

Macon, Georgia

MANUFACTURERS OF

High Pressure Return Tubular Boilers, High Grade Stationary Steam Engines, Tanks, Stacks, Stand Pipes.

Heavy Castings and Wrought Iron Works.

SOMETHING NEW!

SOUTHERN RAILWAY

LOCAL SLEEPING CAR SERVICE

between

ATLANTA and MACON

Go to bed	9:00 P.M.
Lv. Atlanta	11:35 P.M. C.T.
Ar. Macon	3:05 A.M. E.T.
Stay in car until	7:00 A.M.

Go to bed	9:00 P.M.
Lv. Macon	4:35 A.M. E.T.
Ar. Atlanta	6:10 A.M. C.T.
Stay in car until	7:00 A.M.

Lower Berth $2.00; Upper $1.60.

Commission Merchants, Yarn Dealers, Cotton Dealers and Brokers, Banks, Etc.

The Recognized Standards of Quality

COTTON YARNS

Gray Manufacturing Co.
Arrow Mills, Inc.
Parkdale Mills, Inc.
Flint Manufacturing Co.
Arkray Mills, Inc.
Arlington Cotton Mills
Myrtle Mills, Inc.

Our Fine Yarns Make Fine Fabrics

The manufacturers of a number of America's well known textile products can vouch for the strength, uniformity, cleanliness and better weaving and knitting qualities of our yarns.

The yarns we spin for knitting, weaving, laces and converting, are furnished in all twists on skeins, cones, tubes and warps:

30s to 80s Single and Ply Combed Peeler Right Twist. 30's to 50's Single and Ply Double Carded Peeler, Right or Reverse Twist.

20s to 60s, 2, 3, and 4 Ply, Combed Peeler, Reverse Twist.

Our products are sold direct and exclusively through our General Sales Offices:
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H. A. FLORSHEIM, Sales Manager
Long Distance Phone:
Madison Sq. 7666-7-8 and 9.

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GRAY DAWN QUALITY YARNS Gray Manufacturing Co. Gastonia, N.C.

ARROW MILLS COMBED YARNS GASTONIA, N.C.

MYRTLE MILLS INC. COTTON YARNS GASTONIA, N.C.

PARKDALE MILLS, Inc. PARKDALE YARNS ARE THE BEST GASTONIA, N.C.

ARLINGTON COTTON MILLS COTTON YARNS GASTONIA, N.C.

ARKRAY MILLS FINE COMBED YARNS GASTONIA, N.C.

FLINT MFG. CO. TRADE FLINT MARK GASTONIA, N.C.

Weimar Bros.

Phone Connections
Works, 2046-48 Amber Street,
PHILADELPHIA, PA.

MANUFACTURERS OF

Cotton Mercerized Tapes, Spool Tapes, Bindings and Narrow Fabrics for Underwear and other Trades.

WOODWARD, BALDWIN & CO.

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IMPORTER AND COMMISSION MERCHANT

LINEN YARNS

For Weaving, Knitting and all Purposes.

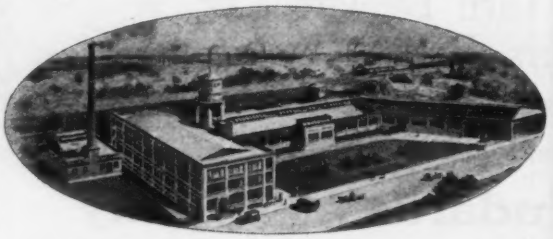
TURKEY RED YARNS

For Towel Borders, Towellings and Bleaching Cloth

Linen Jacquard Harness Twine

And Every Description of Linen Thread and Twine

115 Franklin Street, : NEW YORK



View of our Mercerizing and Bleaching Plant

BOGER & CRAWFORD

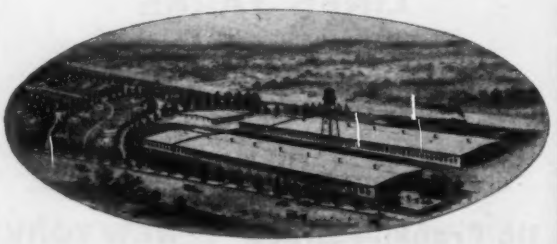
Established 1908

Spinners, Bleachers and Mercerizers of High Grade Combed Yarns

By using our Spinning and Mercerizing you are always assured of a standard product

"From the Cotton Field Direct to You"

Main Office, Factory and Warehouse
J and East Venango Sts., PHILADELPHIA



Spinning Mills, Lincolnton, N. C.

ESTABLISHED 1872

H. & B. BEER

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HENRY BEER — EDGAR H. BRIGHT
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Specialists in Cost Systems and Manufacturing Accounts.

C. B. BIDWELL, P. A., Resident Vice-President

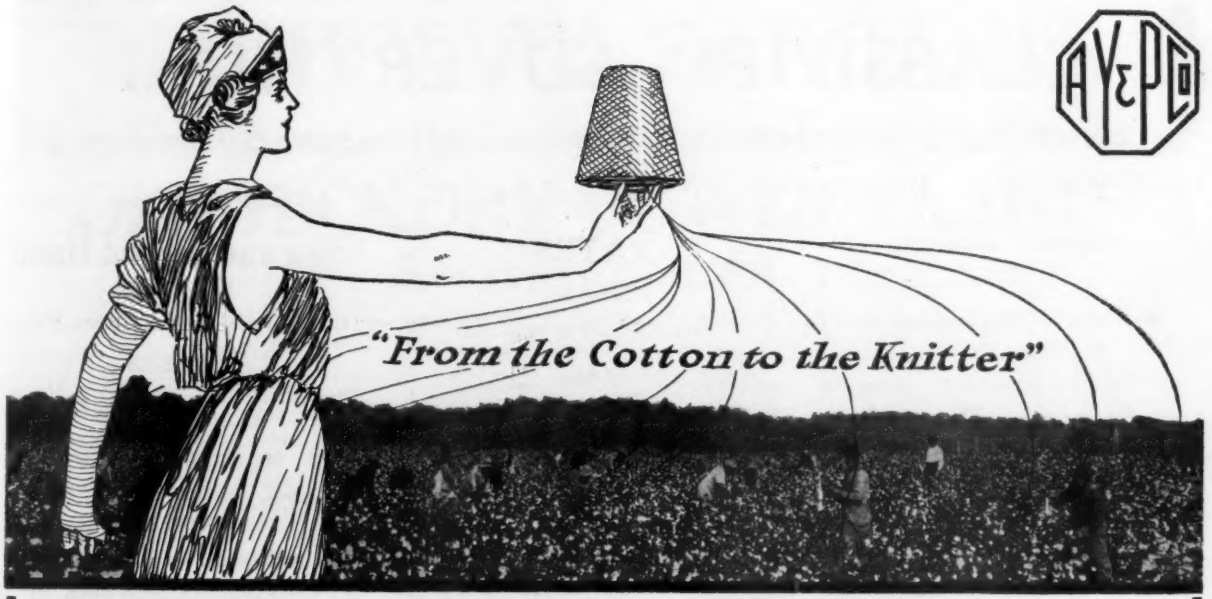
CARVER-BEAVER YARN CO.

Successors to A. D. SALKELD & BRO., Inc.

ALL NUMBERS COTTON MERINO **YARNS** ALL COLORS WOOL WORSTED

366 BROADWAY, NEW YORK

ADVERTISING is an economy and cuts the cost of selling, making lower prices or better goods possible without sacrifice of the sellers' profits.



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AMERICAN YARN & PROCESSING CO.

MOUNT HOLLY, N. C.

SPINNERS AND MERCERIZERS

HIGH GRADE COMBED AND CARDED YARNS—16s to 80s

Our Mercerized Yarns Are the Product of Our Own Mills

General Office, Mt. Holly, N. C. **Branch Office, 1111 James Bldg., Chattanooga, Tenn.**

Representatives

H. B. ROBIE, 346 Broadway, New York City **FORREST BROS., Forrest Bldg., Philadelphia**

THE MARTINIQUE

(Affiliated with Hotel McAlpin)

Broadway, 32nd and 33rd Streets

NEW YORK CITY

SITUATED IN CENTER OF SHOPPING DISTRICT—Adjacent to Theatre Section

Entrance from Hotel to New York Subway and Hudson Tubes affording direct communication with the Pennsylvania and Grand Central Stations, also general Post Office and Railroad Stations at Jersey City.

The Restaurants offer a truly McAlpin Service—with Club Breakfasts, Special luncheons and Dinners, also a la Carte Service—All at moderate prices.

600 ROOMS

PLEASANT ROOMS FROM $2.50 UP.

FRANK E. JAGO—Resident Manager

Hotel Sinton

Nationally known for its three famous dining rooms

CINCINNATI

700 ROOMS 700 BATHS 700 SERVIDORS

MODERATE TARIFFS

Write for Booklet on Cincinnati and The Hotel Sinton. We will also send Mail Order price list of the Famous Hotel Sinton Louis XVI Candies.

HOTEL SINTON Management of John L. Horgan **CINCINNATI**

CLASSIFIED ADVERTISING

SUCCESSFUL BUSINESS MANAGER

of a weekly textile journal wants proposition offering larger opportunities.

Box 46, c/o Cotton, Atlanta, Ga.

Salesman Wanted

Salesman acquainted with buyers and who can obtain orders for sales and order books, can make favorable commission arrangements with leading Chicago concern in this line. Chicago Sales Book Co., 337 W. Madison St., Chicago.

Position Wanted

Young man 26 years of age desires position, either clerical or technical. Fourteen years mill experience. Textile college student and also I. C. S. Textile student. Stenographer, capable of doing general office work. Salary no object if position offers a future. Address Box 47, care COTTON, Atlanta, Ga.

RATES:

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"For Sale" and all other advertisements using bold-face type or otherwise displayed, $2.00 per inch per insertion.

Rates for larger spaces furnished on application.

WITHOUT DISPLAY.

"Positions Wanted" 3 cents per word per insertion. Minimum charge 50 cents. Payable in advance.

"Positions Open" and other undisplayed advertisements, 4 cents per word per insertion. Minimum charge $1.00. Payable in advance.

(*When replies are to be received in our care, allow four words for box address,*)

New and Second Hand

ENGINES

Corliss Automatic and Slide Valve

BOILERS

Pumps, Hoisting Engines, Gas and Gasoline Engines.

MACHINE TOOLS

Lathes, Planers, Shapers, Drill Presses, etc.

WOOD WORKING

Planers, Molders, Band Saws, etc.

ELEC. MACHINERY

Dynamos and Motors
AND SUPPLIES OF ALL KINDS

FRANK TOOMEY, Inc.,
127-31 N. Third St.
Philadelphia, - Pennsylvania

Do You Want to Sell It?

Probably you, like many other mills, have some equipment or machinery which you have taken out, or are thinking of taking out and replacing with new equipment.

Why not dispose of this second-hand equipment at a profit? COTTON is read by hundreds of Cotton Mills that are hardly touched by Northern journals.

You Can Sell Your Second-Hand Equipment

to these mills through advertising in the Classified Advertising Section of COTTON. Such advertising produces results at small cost—why not try it out and get that second-hand equipment off your hands in a profitable way? Tell us what you have for sale and let us insert an advertisement for you.

COTTON

Grant Building, Atlanta, Ga.

American Roofing & Paint Co., Inc.

Dealers in
PAINTS, VARNISHES, STAINS,
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2—10-in. Allis-Chalmers, Type S, 3,750 G.P.M., 130 feet head at 1,765 R.P.M. direct connected to 150 H.P. Westinghouse, 3 phase, 60 cycle, 2,200 volt motors.

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6—16-in. Allis-Chalmers, Type S, 8,500 G.P.M. at 90 feet head, direct connected to Type L, 300 H.P., 2000 R.P.M. G.E. Curtis Steam Turbine.

6—14-in. Allis-Chalmers, Type S, 6,500 G.P.M. at 150 feet head, 8,100 G.P.M. at 90 feet head, direct connected to 300 H.P., 2,000 R.P.M. G.E. Curtis Steam Turbine.

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Bulletin No. 12, Industrial Railway Equipment.
Bulletin No. 13, Hardware and Supplies.
Bulletin No. 14, Chemical Ware and Technical Machinery.
Bulletin No. 15, Transmission Equipment.
Bulletin No. 16, Building Materials, Plumbing, etc.

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Ernst & Ernst.

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Sanymetal Products Co.

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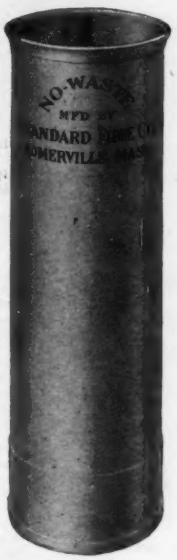

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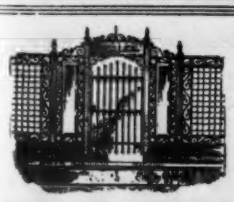

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Counters—Revolution, Hank, Pick, Etc.
Boston Machine Works.
Foxboro Co.
Slaughter, G. G.

Counters—Restaurant.
(See Restaurant Equipment.)

Coupling—Shaft.
Cresson-Morris Co.
Wood's Sons Co., T. B.

Covering—Roller.
Philadelphia Felt Co.

Cranes.
(See Hoists).

Creosoted Flooring, Blocks, Posts, Shingles, etc.
Southern Wood Preserving Co.

Cutters—Cloth.
(See Cloth Cutters).

Cypress Lumber.
Southern Cypress Mfg. Asso.

Cutters—Thread.
(See Thread Cutters).

Delivery Cases.
(See Boxes—Packing).

Desks (Factory).
Lupton's Sons Co., David.

Dial Scales.
(See Scales).

Dies—Steel.
(See Stamps, Stencils, Etc.).

Disinfectants.
Barrett Co., The
Sanitas Co.

Dobby Chains.
Crompton & Knowles Loom Wks
Whitin Machine Works.

Doffing Boxes—Mill.
(See Boxes—Mill).

Doffing Cars.
(See Cars).

Doors—Steel.
Lupton's Sons Co., David.

Draft Gauges.
(See Gauges—Draft).

Drawing Frames.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

Drills—Electric.
(See Electric Machinery).

Drinking Fountains.
(See Fountains—Drinking).

Drop Wires.
Greist Mfg. Co.
Mossberg Pressed Steel Corp.
Steel Heddle Mfg. Co.

Drying Apparatus.
Bayley Mfg. Co.
Buckeye Blower Co.

Drying Forms—Hosiery.
Pearson, Jos. T.

Drying Machinery.
American Laundry Mchry. Co.
Butterworth, H. W., & Sons Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

Dust Collectors.
(See Blowers and Blowing Systems).

Dusting Machinery.
Schofield Co., Wm.
Smith & Furbush Mach. Co.

Dyers, Bleachers and Finishers.
American Yarn & Processing Co.
Boger & Crawford.
Dixie Mercerizing Co.
Franklin Process Co.

Dyeing, Bleaching, Finishing and Printing Machinery and Equipment
American Laundry Mchry. Co.
Butterworth & Sons Co., H. W.
Cocker Mch. & Foundry Co.
Cole Mfg. Co., R. D.
East Jersey Pipe Co.
Electro Bleaching Gas Co.
Firsching, J. A.
Fletcher Works.
Franklin Process Co.
Hauser-Stander Tank Co.
Klauder-Weldon Dyeing Mch. Co.
Manufacturers Machine Co.
Permutit Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Schaum & Uhlinger.
Textile Finishing Machinery Co. The.
Tolhurst Machine Works.
U. S. & Cuban Allied Works, Eng'g. Corp.

Dyeing Machines (Package and Spool.)
Franklin Process Co.

Dye Sticks.
Phila. Drying Machinery Co.

Dyestuffs and Chemicals.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Barrett Co.
Borne, Scrymser Co.
Bosson & Lane.
Ciba Co., Inc.
Du Pont de Nemours & Co., E. I.
Electro Bleaching Gas Co.
Ford Co., J. B.
Grasselli Chemical Co.
India Alkali Works.
Kali Mfg. Co.
Klipstein & Co., A.
Lewis, John D.
Metz & Co., H. A.
Mathieson Alkali Works. Inc
National Aniline & Chemical Co.
Newport Chemical Works, Inc.
Roessler & Hasslacher Chemical Co.
Sandoz Chemical Co.
Sonneborn Sons Co., Inc., L.
Staley Mfg. Co., A. E.
Surpass Chemical Co.
United Chemical Products Corp
Wolf & Co., Jacques.

Elastic Stockings.
Estes Surgical Supply Co.
Perryman-Burson Co.

Electric Conduit & Fittings.
(See Electrical Machry. & Supplies.)

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BUYERS' INDEX—Continued.

Electric Dynamos and Motors.
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Electric Fans.
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Electric Lamps.
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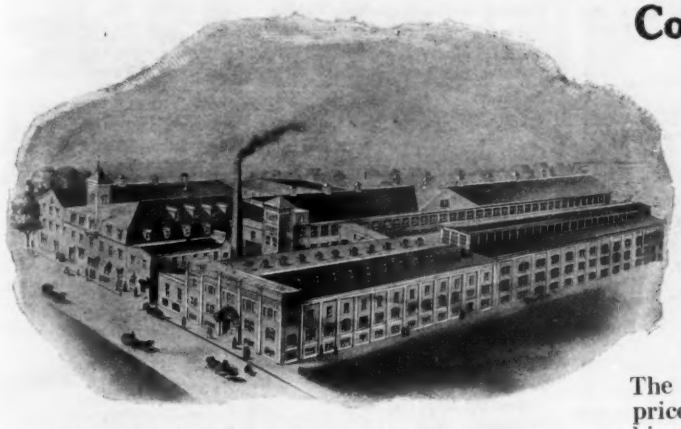
Electric Lamp Guards.
Bryan Electric Co.
Flexible Steel Lacing Co.
Ivanhoe Regent Works.
Electrical Engineers and Contractors.
Huntington & Guerry, Inc.
Ivanhoe Regent Works.
Electric Lighting Engineers.
See Illuminating Engineer.
Electrical Machinery and Supplies.
Allis-Chalmers Mfg. Co.
Bayley Mfg. Co.
Blake Electric Mfg. Co.
Bryan Electric Co.
Carter Electric Co.
Cutter Works, George.
Federal Electric Co.
General Electric Co.
Ivanhoe-Regent Works.
Slaughter Mchry. Co., G. G.
Walraven Co., The.
Walsh & Weidner Boiler Co.
Westinghouse Elec. & Mfg. Co.
Electric Tractors and Trucks.
(See Tractors & Trucks—Elec).
Elevators—Portable.
Collins, J. D.
Elevators.
Link-Belt Company.
Emergency Supplies for First Aid Rooms.
Estes Surgical Supply Co.
Perryman-Burson Co.
Enamel—Mill White.
(See Paint).
Engineers—Mill.
(See Architects).
Engines—Oil, Gas and Gasoline.
Allis-Chalmers Mfg. Co.
Walraven Co., The.
Engines—Steam.
Allis-Chalmers Mfg. Co.
Cole Mfg. Co., R. D.
Lombard Iron Works & Supply Co.
Nashville Industrial Corp.
Schofield's Sons Co., J. S.
Toomey, Frank.
Engine Room Appliances and Supplies.
Crane Co.
Lunkenheimer Co.
Nashville Industrial Corp.
Slaughter Mchry. Co., G. G.
Walraven Co.
Westinghouse Electric & Mfg. Co.
Exporters—Cotton.
(See Brokers).
Extractors—Hydro.
American Laundry Mchry. Co.
East Jersey Pipe Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Machine Works.
U. S. & Cuban Allied Works, Eng'g. Corp.
Fans—Electric.
Bayley Mfg. Co.
Buckeye Blower Co.
Bryan Electric Co.
Carter Electric Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.
Fans—Conveying, Power and Exhaust.
(See Blowers and Blowing Systems).
Fasteners—Belt.
(See Belt Fasteners).
Feed Water Purifiers.
(See Boiler Feed Water Purification).
Feeders.
(See Automatic Feeders.)
Felt Cloth for Rolls.
Philadelphia Felt Co.
Felting Machinery.
Smith & Furbush Mch. Co.
Fence—Steel and Iron.
Anchor Post Iron Works.
Fence Posts (Creosoted Pine.)
Southern Wood Preserving Co.
Fibre Products.
Standard Fibre Co.
Fillets (Calender and Doffer, Strippers, Burnishing and Emery.)
Howard Bros. Mfg. Co.
Films (Motion Picture).
Brombers Attractions, Arthur C.
Federated Films of Atlanta.
Savini Films, Inc., R. M.
Southern States Film Co.
Filters—Water.
American Water Softener Co.
Norwood Engineering Co.
Permutit Co.
Scaife & Sons Co., Wm. B.
Filters—Oil Removal.
Norwood Engineering Co.
Permutit Co.
Filters—Sand.
Permutit Co.
Finishing.
(See Dyers, Bleachers and Finishers).
Finishing, Bleaching and Sizing Materials.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Barrett Co.
Borne, Scrymser Co.
Bosson & Lane.
Ciba Co., Inc.
Corn Products Refining Co.
Du Pont de Nemours & Co., E. I.
Electro Bleaching Gas Co.
Electric Smelting & Alluminum Co.
Ford Co., J. B.
India Alkali Works.
Kali Mfg. Co.
Keever Starch Co.
Klipstein & Co., A.
Mathieson Alkali Works, Inc.
Metz & Co., H. A.
Moore Oil Refining Co.
National Aniline & Chemical Co.
Newport Chemical Works.
Roessler & Hasslacher Co.
Sandoz Chemical Co.
Sonneborn Sons, Inc., L.
Staley Mfg. Co., A. E.
Stearns, Wm. Taylor.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.
Fire Doors and Hardware.
Lupton Sons Co., David.
Sanymetal Products Co.
Fire Hose.
(See Hose—Fire).
Fire Protecting Paint.
(See Paint).
First Aid Room Equipment and Supplies.
Estes Surgical Supply Co.
Perryman-Burson Co.
Flexible Couplings.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.
Flood Lights—Electric.
General Electric Co.
Flooring—Lumber.
Hightower Box & Tank Co.
Southern Cypress Mfg. Co.
Southern Wood Preserving Co.
Flooring (Wood Blocks).
Southern Wood Preserving Co.
Floor Scrubbing Machine.
American Scrubbing Equip. Co.
Floor Scrubbing Powders.
India Alkali Works.
Floor Sweeps.
See Brushes.
Fluted Rolls.
Howard & Bullough.
Saco-Lowell Shops.
Schofield & Sons, J. S.
Smith & Furbush Mach. Co.
Southern Spindle & Flyer Co.
Whitin Machine Works.
Flyers.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.
Founders.
Brown Co., A. & F.
Cole Mfg. Co., R. D.
Cresson-Morris Co.
Lombard Fdry. & Mch. Works.
Fountains—Drinking.
Crane Co.
Miles Refrigerating Co.
Pure Sanitary Drinking Fountain Co.
Rundle-Spence Mfg. Co.
Taylor, Halsey W.
Twentieth Century Brass Works.
Friction Clutches.
(See Clutches—Friction).
Fuel.
(See Coal).
Fuses (Electric).
Bryan Electric Co.
Carter Electric Co.
Federal Electric Co.
Garnett Machines.
Roy & Son Co., B. S.
Smith & Furbush Mach. Co.
Gas Engines.
(See Engines—Gas).
Gaskets.
Walraven Co.
Gauges (Steam Pressure, Etc.)
Foxboro Co., Inc.
Taylor Instrument Co.
Gauge Cocks.
Lunkenheimer Co.
Gauge—Oil.
Brown Co., A. & F.
Lunkenheimer Co.
Gauges—Water.
Lunkenheimer Co.
Gears—Silent.
Brown Co., A. & F.
Diamond State Fibre Co.
General Electric Co.
Link-Belt Company.
Morse Chain Co.
Gear Cutting and Cutters.
Brown Co., A. & F.
Cresson-Morris Co.
Gear Pullers.
General Electric Co.
Generators—Electric.
(See Motors and Generators).
Glassware and Dishes.
(See Dishes).
Glass Skylights.
Drouve Co., G.
Governors—Pump.
General Electric Co.
Graphite.
Dixon Crucible Co., Jos.
Grates—Boiler.
Cole Mfg. Co., R. D.
International Eng. Works.
Lombard Fdry. & Mch. Co.
Walsh & Weidner Boiler Co.
Grates—Mechanical.
(See Stokers).
Grease.
(See Lubricants).
Grease Cups.
(See Lubricators).
Grinders—Card, Cylinder, Roll, Napper and Garnet.
(See Card Grinding Machinery).
Guards—Electric Lamp.
Bryan Electric Co.
Flexible Steel Lacing Co.
Guides—Thread.
Palmer Co., I. E.
Guider (Cloth-Electric.)
Blake Electric Mfg. Co.
Gums.
(See Finishing and Sizing Materials).
Hangers.
(See Shafting and Hangers).
Hardware (Building.)
Sanymetal Products Co.
Harness—Loom.
American Supply Co.
Atlanta Harness & Reed Mfg. Co.
Crompton & Knowles Loom Wks.
Emmons Loom Harness Co.
Greist Mfg. Co.
Garland Mfg. Co.
Heads—Bobbin and Spool.
Lestershire Spool & Mfg. Co.
Heaters.
Bayley Mfg. Co.
Heating and Ventilating Apparatus.
(See Ventilating Apparatus).
Heddles.
Crompton & Knowles Loom Wks.
Draper Corporation.
Steel Heddle Mfg. Co.
Heddle Frames.
Crompton & Knowles Loom Wks.
Steel Heddle Mfg. Co.
Hoists.
Curtis Pneumatic Mchry. Co.
Link-Belt Company.
Morse Chain Co.
Walraven Co.
Hopper Feeders.
(See Automatic Feeders.)
Hose—Fire.
Collins, J. D.
Walraven Co.
Hosiery Dyeing Machinery.
Cooker Mach. & Fdry. Co.
Cole Mfg. Co., R. D.
Franklin Process Co.
Hosiery Forms.
(See Drying Forms).
Hosiery Yarns.
(See Yarn Manufacturers).
Hospital Equipment and Supplies.
Estes Surgical Supply Co.
Perryman-Burson Co.
Hotels.
Hotel Martinique.
Hotel Sinton.
Hotel Tuller.
Houses (Steel.)
Blaw-Knox Co.
Humidifying Apparatus.
American Moistening Co.
Bayley Mfg. Co.
Carrier Eng. Corp.
Manufacturers Machine Co.
Parks-Cramer Co.
Humidity Indicating Instruments.
Powers Regulator Co.
Hydrometers.
Taylor Instrument Co.
Hydrodeiks.
Taylor Instrument Co.
Hydraulic Turbines.
(See Turbines—Hydraulic).
Hydro Extractors.
(See Extractors).
Ice Machines.
Miles Refrigerating Co.
Southern Ice Machine Co.
Illuminating Engineers.
Huntington & Guerry.
Ivanhoe-Regent Works.
Indicating and Recording Instruments and Thermometers.
Foxboro Co., Inc.
General Electric Co.
Powers Regulator Co.
Taylor Instrument Co.
Indigo.
(See Dyestuffs and Chemicals).
Indicators for Roving Cans.
O'Malley & Carroll.
Industrial Sites.
Nashville Industrial Corp.
Injectors.
Lunkenheimer Co.
Ink—Stencil and Marking.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.
Iron Work—Ornamental.
Anchor Post Iron Works.
Dufur & Co.
Lombard Iron Works & Supply Co.
Jack Spools.
(See Spools).
Jacquards.
Crompton & Knowles Loom Wks.
Joint Compound.
Dixon Crucible Co., Jos.
Jute Bagging Machine.
Smith & Furbush Machine Co.
Kettles—Size.
(See Size Kettles).
Kettles—Soda.
Lombard Iron Works & Sup. Co.
Kiers.
(See Bleacher Kiers).
Knit Goods.
(See Cotton Cloth Commission Merchants and Dealers).
Knit Goods Washers.
(See Washers—Cloth).
Knitting Machinery and Supplies.
Brinton Co., H.
General Machine Works.
Hemphill Mfg. Co.
Markem Machine Co.
Scott & Williams.
Trump Bros. Machine Co.
Wildman Mfg. Co.
Laboratory Instruments and Thermometers.
Estes Surgical Supply Co.
Perryman-Burson Co.
Taylor Instrument Co.
Lacing—Belt.
(See Belt Lacing).



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Carter Electric Co.
Cutter Works, George.
General Electric Co.
Ivanhoe Regent Works of G. E. Co.
Walraven Co.
Westinghouse Elec. & Mfg. Co.

Lamp Guards—Key Locking.
Bryan Electric Co.
Flexible Steel Lacing Co.

Lamp Reflectors.
Bryan Electric Co.
Carter Electric Co.
Cutter Works, George.
Ivanhoe Regent Works of G. E. Co.
Westinghouse Elec. & Mfg. Co.

Landscape Architects.
(See Village Architects).

Lappers.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Latches (Fire Exit Self-Releasing.)
Vonnegut Hardware Co.

Laundry Machinery.
American Laundry Mach'y Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Machine Works.

Lavatories.
Crane Co.
Vogel Co., Jos. A.

Leather Belting.
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Leather Specialties.
American Supply Co.
Williams & Sons, I. B.

Lights—Flood.
Cutter Works, George.
General Electric Co.
Ivanhoe-Regent Works.
Westinghouse Elec. & Mfg. Co.

Lighting Engineers & Contractors.
See Illuminating Engineers.

Linen Yarns.
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Link Belting.
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Linters.
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Liquid Chlorine.
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Loaders—Wagon and Truck.
Link-Belt Company.

Lockers—Metal.
Collins, J. D.
Lupton Sons Co., David.
Sanymetal Products Co.

Logwood Extract.
(See Dyestuffs and Chemicals).

Looms.
Crompton & Knowles Loom Wks.
Draper Corporation.
Fletcher Works.
Saco-Lowell Shops.
Schaum & Uhlinger.
Stafford Co.

Loom Attachments—Automatic.
Clayton & Bentley Co.
Draper Corporation.

Loom Harness.
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Lubricants.
D-A Lubricant Co.
Dixon Crucible Co., Jos.
Masury Young Co.
Moore Oil Refining Co.
N. Y. & N. J. Lubricant Co.
Swan & Finch Co.

Lubricators.
Lidseen
Lunkenheimer Co.
N. Y. & N. J. Lubricant Co.

Lug Straps.
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Lumber.
Cornell Wood Product Co.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.

Lunch Room Equipment.
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Machine Tools.
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Machinists.
Cole Mfg. Co., R. D.
Cresson-Morris Co.
Lombard Fdry. & Mch. Wks.

Marking Machines
Markem Machine Co.

Marking Pots, Stencils, Inks, Etc.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.

Mercerized Yarns.
(See Yarn Manufacturers).

Mercerizers.
Aberfoyle Mfg. Co.
Amer. Yarn & Processing Co.
Boger & Crawford.
Dixie Mercerizing Co.

Mercerized Yarn.
Aberfoyle Mfg. Co.
American Yarn & Processing Co.
Boger & Crawford Co.
Dixie Mercerizing Co.

Mercerizing Machinery.
Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co.

Metal Ceilings, Etc.
Lupton's Sons Co., David.

Metals—Perforated.
(See Screens and Sieves).

Metal Workers—Sheet.
Cole Mfg. Co., R. D.
Lombard Iron Works & Supply Co.

Meters—Flow, Air, Gas, Electric Steam, Etc.
Allis-Chalmers Mfg. Co.
Bryan Electric Co.
Carter Electric Co.
Foxboro Co., Inc.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Meters (Counting.)
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Mill Baskets and Boxes.
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Mill Engineer.
(See Architects and Engineers).

Mill Villages.
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Mill Supplies—Miscellaneous.
(See Supplies—Mill).

Mill White Paint.
(See Paint).

Mops.
Atlanta Brush Co.
Harris Broom Co.
Southwestern Broom Mfg. Co

Motion Pictures
(See Films.)

Motors and Generators—Electric.
Allis-Chalmers Mfg. Co.
Bryan Electric Co.
Carter Electric Co.
General Electric Co.
Nashville Industrial Corp.
Walraven Co., The.
Westinghouse Elec. & Mfg. Co.

Musical Instruments & Supplies.
Cable Piano Co.

Moving Picture Mch. & Supplies.
(See Theatre Equipment).

Nappers.
Roy & Son Co., B. S

Office Partitions.
Lupton Sons Co., David
Sanymetal Products Co.

Oil (Lubricating.)
D-A Lubricant Co.
Johnson & Co., Inc., Oliver.
Masury-Young Co.
Moore Oil Refining Co.
Wadsworth, Howland & Co., Inc.

Oils—Finishing.
(See Finishing and Sizing Materials).

Oil Cans.
Lidseen

Oil Cups.
(See Lubricators).

Oil Paper.
Bradley Mfg. Co., A. J.

Oiling Devices.
(See Lubricators).

Openers for Cotton, Wool, Waste, Etc.
Brooks & Doxey, Ltd.
Lord Bros.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co
Whitin Machine Works.

Overhead Carriers.
Curtis Pneumatic Mchry. Co.

Oxidizing Machinery.
Cocker Mch. & Fdry. Co
Phila. Drying Machinery Co.

Oxygen.
Commercial Acetylene Supply Co.
Oxweld Acetylene Co
Standard Gas Products Co.

Packing Boxes & Cases—Wooden.
Hauser-Stander Tank Co.
Hightower Box & Tank Co.
Lewis Co., G. B.
Walke Box Co., Inc.

Packings.
Walraven Co.

Paint.
American Cement Paint Co.
American Roofing & Paint Co.
Barrett Co., The.
Dixon Crucible Co., Jos.
Du Pont de Nemours & Co., E. I.
Johnson & Co., Inc., Oliver.
Wadsworth, Howland & Co., Inc.

Painting Contractors.
(See Contractors.)

Panel Boards.
(See Switchboards).

Paper.
Bradley Mfg. Co., A. J.

Partitions—Steel.
Lupton's Sons Co., David
Sanymetal Products Co.

Perforated Metal.
(See Screens and Sieves).

Peroxides.
Roessler & Hasslacher Chemical Co.

Piano & Players.
Cable Piano Co.

Pickers—Curled Hair.
Schofield Co., Wm.
Smith & Furbush Mach. Co.

Pickers—Leather.
Garland Mfg. Co.

Picker Sticks.
Garland Mfg. Co.
Southern Bending Co.
Shambow Shuttle Co.
Walraven Co.

Picking Machinery.
Howard & Bullough, Am. Machine Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Pinions.
General Electric Co.

Pipe and Pipe Fittings.
Crane Co.
East Jersey Pipe Co.
Parks-Cramer Co.
Scaife & Sons Co., Wm. B.
Walraven Co.

Pipe Joint Compound.
Dixon Crucible Co., Jos.

Pipe Threading and Cutting Machines.
Walraven Co., The.

Playground Apparatus Equipment.
Crane Co.
Puro Sanitary Drinking Fountain Co.
Rundle-Spence Mfg. Co.
Taylor, Halsey W.
Twentieth Century Brass Works.

Pneumatic Machinery & Tools.
Curtis Pneumatic Mchry. Co.

Portable Conveyors.
(See Conveyor.)

Posts—Fence (Wood.)
Southern Wood Preserving Co.

Power (Electric.)
Georgia Railway & Power Co.

Power Transmission.
Aldrich Mach. Works.
Allis-Chalmers Mfg. Co.
Brown Co., A. & F.
Carlyle-Johnson Mch. Co.
Columbia Novelty Mfg. Co.
Cresson-Morris Co.
Dixon Crucible Co., Jos.
Fabreeka Belting Co.
Fafnir Bearing Co.
Flexible Steel Lacing Co.
General Electric Co.
Hyatt Roller Bearing Co.
Link-Belt Company.
Morse Chain Co.
Skayef Ball Bearing Co.
Skinner & Co., Inc., R. D.
Slaughter Mchry. Co., G. G.
Transmission Ball Bearing Co.
U. S. Ball Bearing Co.
Walraven Co., The.
Westinghouse Elec. & Mfg. Co.
Williams & Sons, I. B.
Wood's Sons Co., T. B.

Preservative Paints for Metal Wks.
(See Paints.)

Pressed Steel.
Lupton's Sons Co., David.

Presses.
American Laundry Mchry. Co.
Butterworth & Sons Co., H. W.
Economy Baler Co.
Famous Mfg. Co.
Phila. Drying Mch. Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Pressure Regulators.
(See Regulators—Pressure.)

Printing.
Byrd Printing Co.
Dowman Wilkins Printing Co.
Richards Printing Co., J. B.
Showalter Printing Co., A. J.

Pulleys.
Brown Co., A. & F.
Cole Mfg. Co., R. D.
Dodge Sales & Eng. Co.
Cresson-Morris Co.
Link-Belt Company.
Walraven Co., The.
Wood's Sons Co., T. B.

Pulley Covering.
Williams & Sons, I. B.

Pumps.
Allis-Chalmers Mfg. Co.
Goulds Mfg. Co
Sydnor Pump & Well Co., Inc.
Toomey, Frank.
U. S. & Cuban Allied Works, Eng'g. Corp.
Walraven Co.
Walsh & Weidner Boiler Co., The.
Westinghouse Elec. & Mfg. Co.

Pump Valves.
(See Valve Discs).

Pyrometers.
Taylor Instrument Co.

Quill Cleaning Machines.
Terrell Machine Co.

Railways.
Southern Railway Systems.

Receptacles—Fibre.
(See Fibre Products).

Recording Instruments.
Boston Machine Works.
Foxboro Co., Inc.
General Electric Co.
Powers Regulator Co.
Taylor Instrument Co.

Reeds.
American Supply Co.
Atlanta Harness & Reed Mfg. Co.
Emmons Loom Harness Co.
Shambow Shuttle Co.
Walraven Co.

Reels.
Cocker Mch. & Fdry. Co.
Crompton & Knowles Loom Wks.
Draper Corporation.
Gallaudet Aircraft Corp.
Mossberg Pressed Steel Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Whitin Machine Works.

Reflectors—Lamp.
(See Lamp Reflectors).

Regulators—Liquid Level.
Foxboro Co., Inc.
General Electric Co.
Powers Regulator Co.

Regulators—Pressure.
Foxboro Co., Inc.
General Electric Co.
Powers Regulator Co.
Taylor Instrument Co.

Regulators—Temperature.
(See Temperature Controllers).

Reinforcing Slag.
Birmingham Slag Co.

Repairing—Electrical.
Bryan Electric Co.
Westinghouse Elec. & Mfg. Co.

Repairing—Textile Machinery, Etc.
Bird-Potts Co. Inc.
General Machine Works.
Southern Spindle & Flyer Co.
Standard Gas Products Co.

Restaurant Equipment.
Sanymetal Products Co.

Ribbers.
(See Knitting Machinery.)

Rib Top Cutters.
General Machine Works.
Wildman Mfg. Co.

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Ring Travelers—Steel and Bronze.
Whitinsville Spinning Ring Co.
Whitin Machine Works.

Rings—Spinning.
(See Spinning Rings).

Rocker Shaft Bearings.
(See Bearings).

Rolls—Calender.
Butterworth & Sons Co., H. W.
Roy & Son Co., B. S.
Textile Finishing Machinery Co.

Rolls—Rubber Covered.
Butterworth & Sons Co., H. W.
Textile Finishing Machinery Co.

Rolls—Steel.
Butterworth & Sons Co., H. W.
Southern Spindle & Flyer Co.
Textile Finishing Machinery Co.

Roller Cloth.
Philadelphia Felt Co.

Roofing.
American Roofing & Paint Co.
Barrett Co., The.
Cortright Metal Roofing Co.
Southern Wood Preserving Co.
Wadsworth, Howland & Co.
Walraven Co.

Roof and Cement Coating.
American Roofing & Paint Co.
Barrett Co.
Du Pont de Nemours & Co., E. I.
Johnson & Co., Inc., Oliver.
Wadsworth, Howland & Co.

Rope—Transmission.
Allis-Chalmers Mfg. Co.
Brown Co., A. & F.
Cresson-Morris Co.
Link-Belt Company.
Walraven Co.

Rope Sheaves.
Brown Co., A. & F.

Roving Cans.
(See Cans—Roving.)

Roving Can Indicators.
O'Malley & Carroll.

Roving Machinery.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

Rubber Goods.
Estes Surgical Supply Co.
Perryman-Burson Co.

Rubber Stamps.
(See Stamps, Stencils, Etc)

Salamanders
Drouve Co., G.

Sanitary Products.
Crane Co.
Estes Surgical Supply Co.
Perryman-Burson Co.
Puro Sanitary Drinking Fountain Co.
Rundle-Spence Mfg. Co.
Sanitas Co.
Sanymetal Products Co.
Taylor, Halsey W.
Twentieth Century Brass Mfg. Co.
Vogel Co., Jos. A.

Sash-Window—Steel.
Drouve Co., G.
Lupton's Sons Co., David.
Sanymetal Products Co.

Sash Operator
Drouve Co., G.

Scale Preventer—Boiler.
(See Boiler Feed Water Purification).

Screens (Moving Picture).
Southern Theatre Equipment Co.

Screens and Sieves—Perforated.
Allis-Chalmers Mfg. Co.
Erdle Perforating Co.
Link-Belt Company.

Scouring Machinery.
(See Washers (Cloth)

Scrubbing Machine—Floor.
American Scrubbing Mch. Co.

Scrubbing and Washing Powders.
India Alkali Works.
Mathieson Alkali Works.
Warren Soap Mfg. Co.

Scutchers.
Brooks & Doxey.
Lord Bros.
Whitin Machine Works.

Second Hand Machinery and Supplies.
Bryan Electric Co.
Nashville Industrial Corp
Textile Service & Equip. Co.
Toomey, Frank, Inc.
Walraven Co.

Second Hand Machinery Wanted.
Textile Service & Equip. Co.

Selvage Harness.
(See Harness.)

Sewing Machines.
Merrow Machine Co., The.
Textile Finishing Machinery Co.

Shades—Electric Lamp.
(See Reflectors).

Shafting and Hangers.
Allis-Chalmers Mfg. Co.
Brown Co., A. & F.
Cresson-Morris Co.
Dodge Sales & Eng. Co.
Fafnir Bearing Co.
Link-Belt Co.
Skayef Ball Bearing Co.
Walraven Co., The.
Wood's Sons Co., T. B.

Shears.
Roy & Sons Co., B. S.

Shelving—Sectional Steel.
Collins, J. D.
Hyatt Roller Bearing Co.
Lupton's Sons Co., David.
Sanymetal Products Co.

Shingles—Asphalt.
Barrett Co.

Shingles—Metal.
Cortright Metal Roofing Co.

Shingles—Wood.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.

Shipping Room Machinery and Supplies.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.
Collins, J. D.
Hauser-Stander Tank Co.
Hightower Box & Tank Co.
Lewis Co., G. B.
Standard Fibre Co.
Walraven Co., The.
Walke Box Co., Inc.

Shower Baths and Cabinets.
Crane Co.
Sanymetal Products Co.

Shuttles.
Crompton & Knowles Loom Wks.
Draper Corporation.
Shambow Shuttle Co.
Southern Bending Co.
Walraven Co.

Sick Room Supplies.
Estes Surgical Supply Co.
Perryman-Burson Co.

Signs (Electric).
Federal Electric Co.

Singeing Machinery.
Butterworth & Sons Co., H. W.
Phila. Drying Machine Co.
Textile Finishing Machinery Co., The.

Siren.
Brown Co., A. & F.
Federal Electric Co.

Sites for Factories. (See Industrial Sites.

Size Box Temperature Controller.
Powers Regulator Co.

Size Kettles.
Butterworth & Sons Co., H. W.
Hauser-Stander Tank Co.
Howard & Bullough, American Machine Co.
Lombard Iron Works & Sup. Co.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The.

Sizing and Finishing Compounds.
(See Finishing and Sizing Materials).

Skewers.
Jordan Mfg. Co.

Skylights—
Drouve Co., G.
Lupton's Sons Co., David.

Slag for Concrete.
Birmingham Slag Co.

Slashers and Slasher Room Supplies.
Butterworth & Sons Co., H. W.
Cocker Mch. & Foundry Co.
Cole Mfg. Co., R. D.
Howard & Bullough.
Pickens Slasher Hood Co., R. O.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The.

Slasher Cloth.
Philadelphia Felt Co.

Slasher Hoods.
Cole Mfg. Co., R. D.
Pickens Slasher Hood Co.

Slasher Tape.
(See Tape—Slasher).

Slate Asphalt Roofing.
Barrett Co.

Sliding Partition Hardware.
Lupton Sons Co., David.
Sanymetal Product sCo.

Slubbers.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

Soap—Textile.
Arnold, Hoffman & Co.
Borne, Scrymser Co.
Ciba Co., Inc.
Du Pont de Nemours & Co., E. I.
Electric Smelting & Aluminum Co.
India Alkali Co.
Kali Mfg. Co.
Klipstein & Co., A.
Mathieson Alkali Works, Inc.
Newport Chemical Works.
Sonneborn Sons, Inc., L.
Stearns, Wm. Taylor.
United Chemical Products Corp.
Warren Soap & Mfg. Co.
Wolf & Co., Jacques.

Soda (Textile, Soda Ash and Boiling.)
Klipstein & Co., A.
Mathieson Alkali Works, Inc.
Sonneborn Sons, Inc., L.

Softeners—Cotton.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Borne, Scrymser Co.
Bosson & Lane.
Ciba Co., Inc.
Du Pont de Nemours & Co., E. I.
Ford Co., J. B.
Grasselli Chemical Co.
Kali Mfg. Co.
Klipstein & Co., A.
Mathieson Alkali Works, Inc.
Moore Oil Refining Co.
Newport Chemical Works.
Roessler & Hasslacher Chemical Co.
Sonneborn Sons, Inc., L.
United Chemical Products Corp.
Wolf & Co., Jacques.

Softeners—Water.
(See Water Softeners).

Solderless Connectors—Frankel.
Westinghouse Elec. & Mfg. Co.

Solvents.
(See Finishing).

Speedometers.
(See Counters.)

Spindles.
Draper Corporation.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Vermont Spool & Bobbin Co.
Whitin Machine Works.

Spinners.
Aberfoyle Mfg. Co.
Amer. Yarn & Processing Co.
Arkray Mills, Inc.
Arlington Cotton Mills.
Arrow Mills, Inc.
Boger & Crawford.
Flint Mfg. Co.
Fletcher Works.
Florsheim, H. A.
Gray Mfg. Co.
Myrtle Mills, Inc.
Philadelphia Felt Co.
Parkdale Mills, Inc.

Spinning Frames.
American Machine Co., H. & B.
Brooks & Doxey, Ltd.
Crompton & Knowles Loom Wks.
Howard & Bullough.
Lord Bros.
Schaum & Uhlinger.
Saco-Lowell Shops.
Whitin Machine Works.

Spinning Rings.
Draper Corporation.
Howard & Bullough.
Greist Mfg. Co.
Whitin Machine Works.
Whitinsville Spinning Ring Co.

Spinning Tape Specialists.
American Textile Banding Co., Inc.
Barber Mfg. Co.

Spooling Machinery.
Draper Corporation.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Spooler Tensioning Device.
Textile Specialty Co.

Spools and Skewers.
Lestershire Spool & Mfg. Co.
Mossberg Pressed Steel Corp'n.
Shambow Shuttle Co.
Vermont Spool & Bobbin Co.
Walraven Co.

Sprinkler Tanks.
(See Tanks, Towers, Etc.).

Sprockets.
Link-Belt Company.
Morse Chain Co.

Spur Cap Shells.
Gallaudet Aircraft Corp.

Stamps, Stencils and Stencil Machines.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.

Stand Pipes.
(See Tanks, Towers, Etc.).

Starch and Gums.
(See Finishing and Sizing Materials).

Steam Engines.
(See Engines—Steam).

Steam Hose.
(See Hose—Fire.)

Steam Pumps.
(See Pumps—Steam).

Steam Traps.
(See Traps—Steam.)

Steel Shelving, Doors, Window Partition, Etc)
Collins, J. D.
Lupton's Sons Co., David.
Sanymetal Products Co.

Stencils and Stencil Papers.
(See Stamps and Stencils).

Stencil Brushes.
(See Marking Pots and Brushes).

Stencil Cutting Machines.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.

Sticks (Picker).
See Picker Sticks.

Stop Motion.
Crompton & Knowles Loom Wks.
Draper Corporation.
Eclipse Textile Devices, Inc.
Textile Specialty Co.
Whitin Mch. Wks.
Wildman Mfg. Co.

Stokers.
Westinghouse Elec. & Mfg. Co.
inals.

Storage Racks.
(See Shelving).

Straps—Lug.
Garland Mfg. Co.

Strapping.
(See Leather Specialties or Band Strapping).

Street Lighting Fixtures.
Cutter Works, George.

Supplies—General Mill.
Brown, A. & F.
Howard Bros. Mfg. Co.
Nashville Industrial Corp.
Slaughter Machinery Co., G. S.
Steel Heddle Mfg. Co.
Textile Service & Equip. Co.
Vermont Spool & Bobbin Co.
Walraven Co., The.

Surgical Supplies.
Estes Surgical Supply Co.
Perryman-Burson Co.
Taylor Instrument Co.

Switches—Knife-Elec.
Cutter Works, George.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Switchboards—Panel.
Cutter Co., George.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Tables, Chairs, Etc.
Lupton Sons Co., David.
Sanymetal Products Co.

Tallow.
(See Finishing Machinery.)

Tanks, Towers and Tubs.
Blaw-Knox Co.
Cole Mfg. Co., R. D.
Hauser-Stander Tank Co.
Hightower Box & Tank Co.
Lombard Iron Works & Supply Co.
Permutit Co.
Phila. Drying Machinery Co.
Textile Finishing Machinery Co., The.
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Tapes and Braids.
American Textile Banding Co., Inc.
Barber Mfg. Co.
Weimar Brothers.

Tape Looms—Cotton.
Fletcher Works.
Schaum & Uhlinger.

Tapes—Spinning and Twisting.
Barber Mfg. Co.

Tape Making Machines.
(See Bandage and Tape Mach.)

Telephones—Calling System.
Bryan Electric Co.
Carter Electric Co.
General Electric Co.

Temperature Regulators.
Carrier Eng. Corp.
Foxboro Co., Inc.
General Electric Co.
Parks-Cramer Co.
Powers Regulator Co.
Taylor Instrument Co.

Temples.
Draper Corporation.

Tenters.
Butterworth & Sons Co., The.
Textile Finishing Mach. Co.

Tenter Frame Guider (Electric).
Blake Electric Mfg. Co.

Tension Device for Spoolers.
Textile Specialty Co.

Textile Machinery.
(See Cotton Mill Machinery).

Thermometers (Angle and Straight Stem).
Foxboro Co.
Taylor Instrument Co.

Thermometers (Recording and Index).
Foxboro Co.
Taylor Instrument Co.

Thermostats.
Foxboro Co.
Powers Regulator Co.

Theatre Equipment.
Southern Theatre Equipment Co.

Thin Place Preventers.
Clayton & Bentley Co.
Draper Corporation.

Thread Guides.
Palmer Co., The I. E.
Textile Specialty Co.

Time Clocks.
(See Clocks.)

Tiering Machines.
Collins, J. D.

Ties—Baling.
(See Bale Ties).

Toilets.
Crane Co.
Rundle-Spence Mfg. Co.
Vogel Co., Jos. A.

Toilet Partitions.
Lupton's Sons Co., David.
Sanymetal Products Co.

Tool Cabinets—Steel.
Lupton's Sons Co., David

Tool Stands—Steel.
Lupton's Sons Co., David

Tools—All Kinds.
Walraven Co., The.

Towers.
(See Tanks and Towers).

Tractors—Electric, Industrial.
Collins, J. D.

Transmission—Power.
(See Power Transmission Machinery).

Traps—Return Steam.
Morehead Mfg. Co.

Trucks—Auto.
White Co.

Trucks, Baskets, Etc., (Mill.)
Lewis Co., G. B.
Standard Fibre Co.

Trucks—Electric—Inter.
Collins, J. D.

Trucks—Hand and Elevating.
Collins, J. D.

Trucks—Inter, Etc.
Lewis Co., G. B.
Standard Fibre Co.

Trusses and Abdominal Belts.
Estes Surgical Supply Co.
Perryman-Burson Co.

Turbines (Hydraulic).
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Turbines—Steam.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Twisting Machinery and Supplies.
Barber Mfg. Co.
Draper Corporation.
Howard & Bullough.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Urinals.
Crane Co.
Rundle-Spence Mfg. Co.
Vogel Co., Jos. A.

Unions—Bronze.
Crane Co.
Lunkenheimer Co.

Vacuum Pans.
Cresson-Morris Co.

Valves—Angle, Globe, Cross, Blow-off, Check, Gate, Pop-Safety, etc.).
Crane Co.
Lunkenheimer Co.
Walraven Co.

Valves (Foot).
Brown & Co., A. & F.

Valves—Non-return Stop.
Crane Co.
Lunkenheimer Co.
Walraven Co.

Varnishes.
American Roofing & Paint Co.
Barrett Co.
Du Pont de Nemours & Co., E. I.
Johnson & Co., Inc., Oliver.
Wadsworth, Howland & Co., Inc.

Vats.
(See Tanks.)

Ventilating Apparatus.
Bayley Mfg. Co.
Buckeye Blower Co.
Carlisle & Gale Co.
Carrier Eng. Corp.
Drouve Co., G.
General Electric Co.
Parks-Cramer Co.
Sargent's Sons Co., C. G.
Tolhurst Machine Co.

Village Architects and Designers.
Lockwood, Green & Co.
Robert & Co.
Sirrine, J. E.
Spiker & Lose.
Stuhrman, Edw. A.

Village Houses.
(See Houses—Ready-Built).

Wagon and Car Unloaders.
Curtis Pneumatic Mchy. Co.

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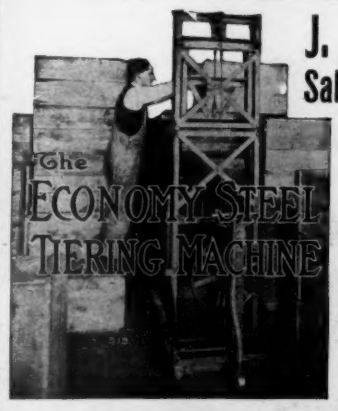

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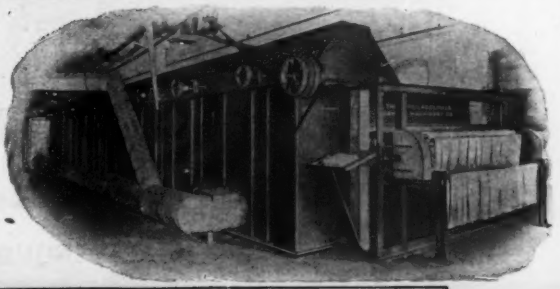

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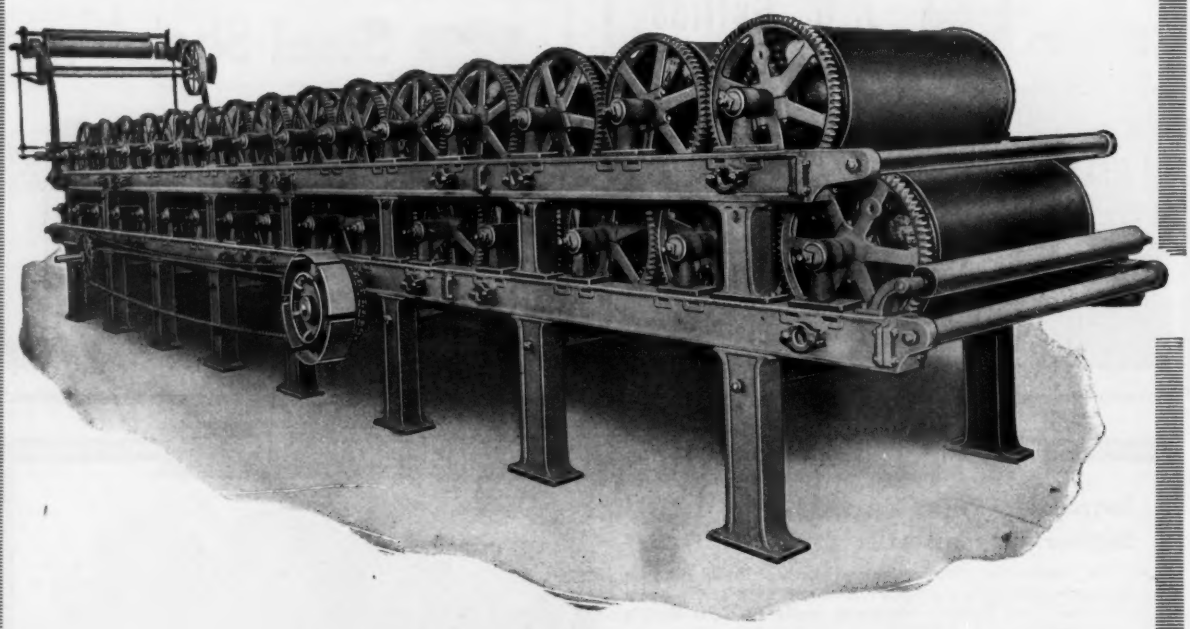

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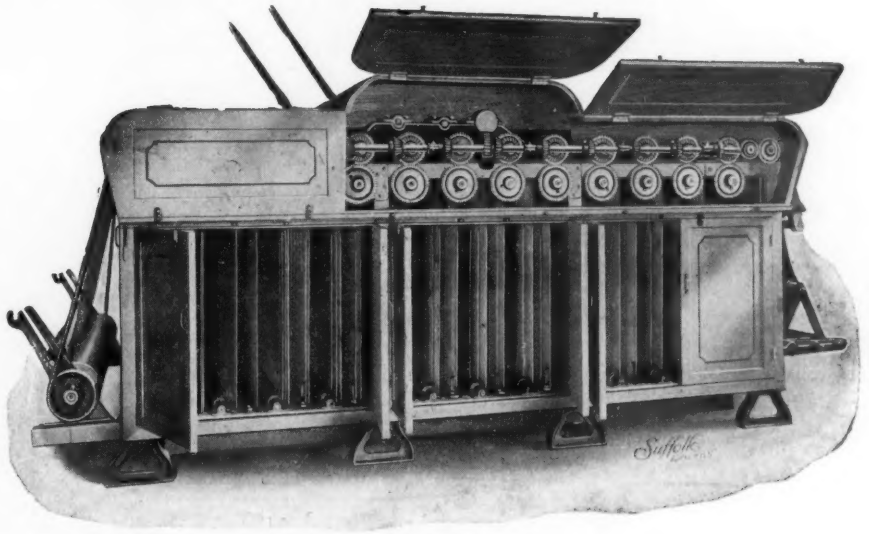

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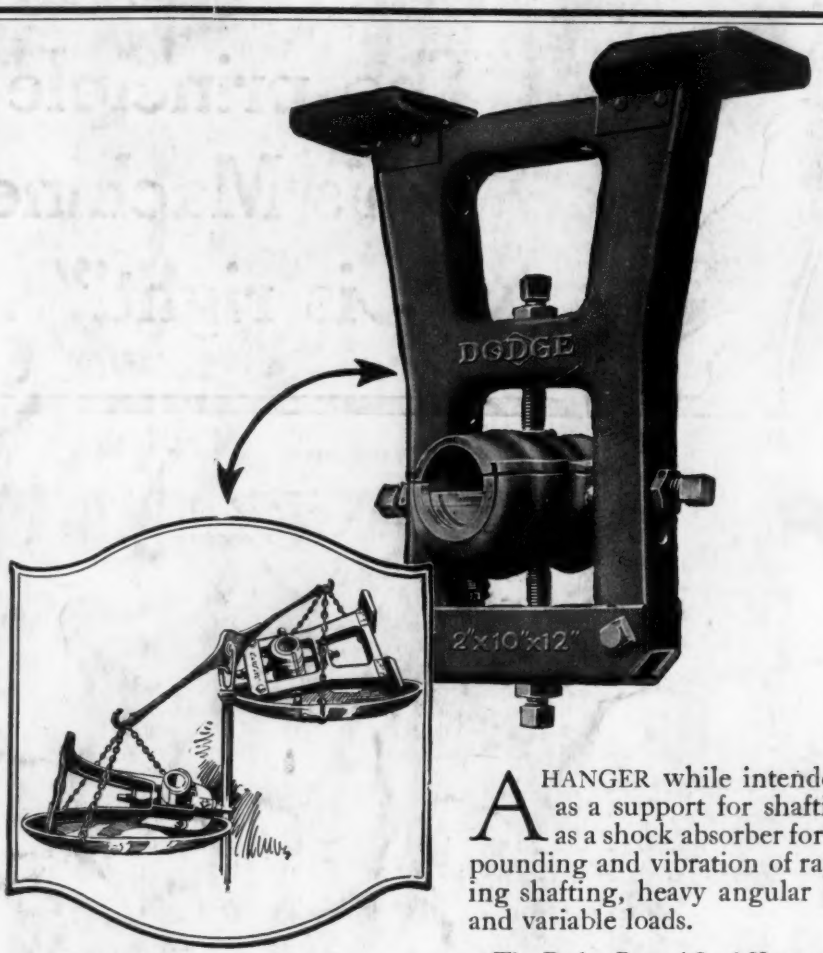

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